A SHIPPING CRATE FROM THE 1865 CALIFORNIA SHIPWRECK *BROTHER JONATHAN*: HARDWARE FROM THE RUSSELL AND ERWIN MANUFACTURING COMPANY

A Thesis

by

CARRIE ELIZABETH SOWDEN

Submitted to the Office of Graduate Studies of
Texas A&M University
in partial fulfillment of the requirements for the degree of

MASTER OF ARTS

May 2006

Major Subject: Anthropology

A SHIPPING CRATE FROM THE 1865 CALIFORNIA SHIPWRECK *BROTHER JONATHAN*: HARDWARE FROM THE RUSSELL AND ERWIN MANUFACTURING COMPANY

A Thesis

by

CARRIE ELIZABETH SOWDEN

Submitted to the Office of Graduate Studies of
Texas A&M University
in partial fulfillment of the requirements for the degree of

MASTER OF ARTS

Approved by:
Chair of Committee, Donny L. Hamilton
Committee Members, C. Wayne Smith
David G. Woodcock
Head of Department, David L. Carlson

May 2006

Major Subject: Anthropology

ABSTRACT

A Shipping Crate from the1865 California Shipwreck *Brother Jonathan*: Hardware from the Russell and Erwin Manufacturing Company. (May 2006)

Carrie Elizabeth Sowden, B.S., Emory University

Chair of Advisory Committee: Dr. Donny L. Hamilton

In the summer of 2000, divers recovered a large shipping crate from the wreck of the *Brother Jonathan*, a steamboat that sank off of Crescent City, California on 30 July 1865. Ownership of the crate was taken over by the state of California and was sent to Texas A&M's Conservation Research Laboratory for excavation and conservation. As soon as work began, it became clear that the crate contained a shipment of a variety of hardware most likely destined for a general store as each of the artifacts discovered was found in high quantities. Also, there was a wide variety of artifacts discovered, tools, architectural pieces, food preparation, fur trapping, and personal items. The crate was shipped from San Francisco from the warehouse of the Russell and Erwin Manufacturing Company; however, its final destination is unknown. Records for this warehouse and for the boat were destroyed in the earthquake and fire of 1906, so the destination for these goods is purely speculative. Using information from the excavation of the crate and a historical analysis of the contents led to a plausible theory. After careful review, it seems most likely that the crate was intended for a general store in a small town with a rural customer base.

ACKNOWLEDGEMENTS

I would like to thank everyone that contributed to this project. First and foremost, a special thanks to James Allen of the Institute for Western Maritime Archaeology and Pamela Griggs of the California State Lands Commission. Without their financial and project support, this study would have never happened. Donny Hamilton, upon receiving this project at the Conservation Research Laboratory, immediately offered it to me as a job as well as a thesis topic, and without that, I might never have finished.

I had so much help at the Conservation Research Laboratory. Helen Dewolf was there everyday, always willing to listen, look, and give guidance, even when I was whining. Jim Jobling was willing to get any supplies that I might need and was always checking in on me to see what new had been uncovered. John Hamilton shared a space with me and offered assistance, guidance, sports radio, and friendship. Amy Borgens and Jon Swanson were always there to take photographs as soon as I requested them.

Thanks to my committee of Donny Hamilton, C. Wayne Smith, and David Woodcock for agreeing to help me and assisting me over the years with encouragement. Special thanks to Professor Woodcock who agreed at the last minute to sit on my committee when I was in dire need. All of the professors in the Nautical Archaeology Program helped with my education and made me feel an equal. Cemal Pulak gave me the opportunity of a lifetime to work with him in Turkey. Kevin Crisman has done more for me than he can ever possibly know by taking me on projects and believing in me and offering guidance and friendship.

Chris Gillcrist and the board of directors of the Great Lakes Historical Society have been especially kind while I struggled to finish. They gave me time off, let me work on office hours, and encouraged me to finish. Without this kindness, I would never have finished on time. Without their consideration, I would have been another unemployed nautical archaeologist.

My family has continued to support me. When I decided to do this, they didn't question it, but just asked how they could help. Their support has kept me afloat for the last thirty years, but even more so, in the last six year. Peter Fix has done everything a person can do for me. Writing a document like this when not at school is difficult. Whenever I needed anything, one small measurement or papers signed, Peter was there to do anything I asked of him. Last, but certainly not least, THANK YOU to Rebecca Ingram. Her friendship has helped me complete this thesis and it would not have happened without her kicking me in the pants a few times to get it done. She has kindly read much of it, laughed at it, and then helped me fix it.

TABLE OF CONTENTS

LIST OF FIGURES

FIGURE Page

CHAPTER I

INTRODUCTION

Objective

Since shipwrecks provide a moment-in-time for archaeologists, they make excellent source material for specific historical time frames. Added to this is the unique nature of the movement of material between cultures and within societies that ships provided. Together, shipwrecks help illuminate the complex nature of cultural and societal relationships at a certain time in history.

The excavation of the steamboat *Brother Jonathan* provides a full picture of the development of the United States during the 1860s. In July 1865, after 15 years of constant work on the east and west coasts of North America, she prepared to sail from San Francisco, California to Victoria, British Columbia, intending to make several stops along the way. She left the San Francisco harbor in the afternoon of 28 July and made her first stop in Crescent City, California in the early hours of 30 July. Shortly after leaving Crescent City, a storm arose causing the ship to sink at noon on that same day, as it was returning to the harbor for protection. This accident was the greatest maritime disaster in California's history; only 19 of the 244 people on board survived. The *Brother Jonathan*'s resting place was finally discovered in 1996 by Deep Sea Research, Inc. After a lengthy court battle over rights to the shipwreck, the state of California was awarded the title to the ship along with all non-monetary artifacts (United States Supreme Court 1998).

This document follows the style and format of *The Society for Historical Archaeology.*

The *Brother Jonathan* carried a wide variety of goods whose study and analysis can shed light on the various needs of the early European settlers in the Pacific Northwest. The entire contents of the shipwreck are a sizable assemblage, the analysis of which would be a massive undertaking and lies beyond the scope of this study. However, the study of a single recovered shipping crate provides valuable links between the post-Gold Rush expansion in the Northwest, industrial manufacturing in the east, and mid-19th-century shipping practices between the east and west coasts of North America.

There are two primary objectives to this thesis. The first of these is the excavation and conservation of a large shipping crate recovered from the *Brother Jonathan* in the summer of 2000. The crate is owned by the state of California who contracted with the Institute of Western Maritime Archaeology, who sub-contracted the crate to the Conservation Research Laboratory at Texas A&M University to complete the work needed to conserve its contents. The preservation of the objects contained in the crate is paramount to understanding, displaying, and making them available for future study. A detailed report of their conservation will both aid future researchers in their study of these artifacts and provide valuable guidelines for other conservators. Second, an historical analysis of the crate and its contents, including information revealed about manufacturing in the east and the needs of European settlers in the northwest, is necessary to understand their place in the material cultural record of the 1860s. The crate contains a shipment of hardware from the Russell & Erwin Manufacturing Company of New Britain, Connecticut. Its intended destination is unknown, but the crate's contents and the *Brother Jonathan's* schedule suggest that it was intended for a general store somewhere between Crescent City, California and Victoria, British Columbia, Canada.

This study aims to create a document that will work with the artifacts in telling their story. Such a document will lend credibility to the items as well as enhance their educational value.

Current Status of the Problem

The science of archaeological artifact conservation evolves constantly; each project undertaken presents a new set of circumstances. The *Brother Jonathan* crate presents certain obstacles that encourage new techniques and procedures unique to its particular artifact assemblage. Each new challenge requires an individual solution, which may aid future conservators faced with similar artifacts or circumstances. "Thinking on your feet" and constant improvisation is required.

Although the gold rush in California had been over for almost 15 years by the time of this disaster, the population of San Francisco continued to grow. The rush to the Northwest was sustained by the discovery of gold mines in Oregon, Washington, Idaho, and Canada. The continuing population increase encouraged growth and city development and, by 1865, the Northwest coast was settled. The permanence of the situation was recognized by the government in Washington, D.C.; California was admitted to the union in 1850, Oregon became a state in 1859, and Washington was to be admitted in 1889. The west coast of North America provided many Americans and newly arrived immigrants from Europe and Asia a profitable new life. There was much more than gold available and many took advantage of the opportunities that the area provided.

The needs of the burgeoning west were vastly different than the needs of the established east. The west was relatively uninhabited by settlers of European decent 20 years before the *Brother Jonathan* sank, and there was a pressing need for all manner of goods and services necessary to the building and maintenance of homes and communities. The *Brother Jonathan* crate provides valuable insight into some of the needs of these western migrants. There seems to be a gap in the historical and archaeological literature and studies of the 20 years between the initial gold rush and the completion of the trans-continental railroad in 1869. Much of this time is often passed over by historians. There are very few specific studies on the needs of the settlers during this time, especially with regard to the material culture. The proposed study would contribute to filling this gap in knowledge.

Most historical studies of eastern manufacturing tend to focus on the companies' influence and place in the culture of the east coast. The source of the artifacts from the *Brother Jonathan* crate were identified by a single imprint left from a hatchet head in a piece of paper. That imprint identified the artifacts as having originated at the Russell & Erwin Manufacturing Company in New Britain, CT. This major hardware company has been researched and profiled in several histories of New Britain, then known as the "Hardware Capital of the World" (Van Slyck 1879; Camp 1889; White 1903; Fowler 1960; Larson 1975; Thibodeau 1989). However, the company's warehouse on the west coast, of vital interest to this study, is rarely mentioned in these chronicles. Due to the earthquake and great fire of San Francisco in 1906, many of the records for the company’s dealings on the west coast were lost.

Using these issues as a starting point, the crate could be cared for and the contents researched to make a document that is usable to future investigators. Hopefully, this thesis can be useful on several fronts including highlighting new conservation procedures, describing time between the gold rush and the completion of the railway on the American west coast, and completing the early history of the Russell and Erwin Manufacturing Company.

Outline

The primary objective of the project was to excavate, extract, identify, and conserve the contents of the *Brother Jonathan* crate. These procedures will be outlined in an extensive chapter on the methodology. Each artifact presented a unique conservation opportunity. The technique used to conserve each artifact was chosen depending on the material in question and degree of degradation or corrosion. The ceramics were treated with polyvinyl acetate in acetone (Olive and Pearson 1975). The traditional method for metal conservation, electrolytic reduction, was used for the brass artifacts (Hamilton 1996:55-92). The cast iron was conserved using sodium sulfite, an accepted treatment for iron that is very fragile and does not retain a sizeable metal core (Gilberg and Seeley 1982). The wood tool handles were treated with the acetone-rosin technique (McKerrell et al. 1972). This treatment, while used less frequently by contemporary conservators, was ideal for these handles.

Other organics, such as leather, paper, and rope, were treated with Polymer Passivation, a procedure that was developed at the Conservation Research Laboratory and the Archaeological Preservation Research Laboratory at Texas A&M University (Smith 2003). Most of the techniques applied to these artifacts have been extensively used and published prior to this study. There are, however, several composite artifacts for which a "cookbook" style of conservation was inappropriate, and those were dealt with individually. These methods will be described in greater detail within the chapter dedicated to the excavation and conservation.

The study also contains two historical chapters, the first covering the history of the *Brother Jonathan*. This has been extensively recorded by Q. David Bowers (1999) in his book *The Treasure Ship S.S. Brother Jonathan: Her Life and Loss, 1850-1865,* which focuses its artifact analysis on the specie that was recovered from the wreck. Starting with this text and expanding the story with extended examples covering all the phases of the *Brother Jonathan*'s career helps illustrate typical shipping practices during the 1850s and 1860s. The second chapter will briefly study the manufacturing sector in Connecticut, focusing on the Russell & Erwin Manufacturing Company. Using published histories, company records, and company catalogs, it is possible to trace this company's meteoric rise and understand why a crate full of their hardware was recovered from the *Brother Jonathan*.

The historical importance of the different categories of artifacts found within the crate and their relation to the material needs of the northwest will be separated into four additional chapters: architecture, tools, fur and food, and personal items. The *Brother*

Jonathan crate contained many goods that were commonly used in households and are described in each of the four chapters. These are common, low cost consumer items that do not often survive in households or museums as they were usually considered banal or unimportant, and were often of poor quality.

The architecture chapter covers the items used to finish a house, including locks, pocket door hardware, and wardrobe hooks. The food chapter includes implements used in gathering (such as animal traps) as well as preparation (such as meat mincers). The *Brother Jonathan* crate contains a number of utility tools, including axes, hatchets, scythes, and coal shovels. Leather belts and knife sheaths are among the personal items found within the crate.

Each category of artifact requires independent and individualized research utilizing a wide variety of primary records and parallel sources specific to the different objects. These primary works include, but are not limited to, patents, catalogs, contemporary photographs and art, and newspaper articles. Comparative information is gathered from museums and other shipwrecks. The compilation of data from these sources as well as secondary documentation will aid researchers using these artifacts to interpret the history of the Northwest as it began its evolution into the influential economy that it is today.

CHAPTER II

THE HISTORY OF THE *BROTHER JONATHAN*

The history of merchant trade on the west coast of North America has been chronicled many times over. The *Brother Jonathan* was one ship that worked over several different trade routes during its history. It was built for the California gold rush, but it worked on both sides of the Panama and Nicaragua isthmus. After the initial California gold rush was over, it traded coastally from San Diego to Vancouver Island and British Columbia until its demise in 1865. This chapter discusses the ship's history within the social, economic, and political atmosphere of the 1850s and 1860s. Important topics of this period include the California gold rush, the development of towns in the northwest, and the discovery of gold at Fraser River in Canada.

The Beginning

The discovery of gold in 1848 spurred a population boom in California beginning in 1849. However, the transportation infrastructure needed to carry the influx of people was nonexistent. The Pacific Mail Steamship Company and the United States Mail Steamship Company, chartered just before the announcement of the discovery in California, did not have the facilities in place to service all that wanted passage. At the onset of the gold rush, the first boat to reach Panama had room for only 60 passengers but took 360 to San Francisco (Delgado 1990:34-35). The need for more passenger space to California left an open market for those interested in steamship service.

Edward Mills ordered the S.S. *Brother Jonathan* so he could use it to trade on the east coast of the United States. The builders, Perrine, Patterson and Stack, launched the vessel on 2 November 1850 in Williamsburgh, New York; it cost $190,000. It measured 220 feet 11 inches long with a breadth of 36 feet; with a normal load, the draught was 13 feet and 10 inches. Though the exact specification has been lost, the most reliable published weight was 1,360 tons. The tonnage calculation set by the government in 1850 was the Old Custom House Measurement: [(length-3/5 beam) * beam * depth of hold] / 95. This gives the *Brother Jonathan* a tonnage of around 1045 (Kemble 1990:213). In the 19th century, ship specifications, at launch, were not public domain; the numbers published in papers were often estimations by the columnist. Consequently, there are several different reported tonnages for the *Brother Jonathan* at its launch. The *Brother Jonathan* went through several renovations and rebuilds and the specifications changed after each. This could account for discrepancies in secondary sources.

The hull was constructed of locust, white oak, live oak, and cedar (Kemble 1990:217; Bowers 1999:167). Diagonal braces of iron fortified the ship's interior. Robert Gardiner states that wooden ships were not compatible with steam engines; the rattle of the engines had a tendency to vibrate the many pieces of a wooden ship hull, which could cause leaks. They had less cargo space and a tendency to hog (1993a:21). The English began using iron in shipbuilding in the late 18th century (Gardiner 1993b:53). The use of iron in hulls was becoming more commonplace, especially in England where at this time they built ships for sail and steam with entire hulls of iron (Gardiner 1993b:53). Isambard Kingdom Brunel’s great ship the *Great Britain*, launched in 1843, had an iron hull and proved to be a great success (Gardiner 1993a:87). Iron ships in the Americas were not built with any regularity until the last quarter of the

19th century, well after the launch of the *Brother Jonathan* (Gardiner 1993a:74). Wood was so much more prevalent in the United States than in Europe; there was no economic need to build with iron. In 1851, it was still easier and cheaper to build with wood in the United States.

With the launch of the first trans-oceanic steamship in 1846, ship design remained consistent. The ocean-going steam vessel design maintained a similarity to the *Southerner*, a New York and New Orleans Steamship Company boat built in 1846. The boat was reminiscent of the contemporary sailing packets with a clipper style bow and a transom stern, but with a greater protection of the paddlewheels than past steamships (Gardiner 1993a:74). Most oceanic steam vessels built in New England used this successful plan until the Civil War.

The engine in the *Brother Jonathan* was a walking beam engine, which performed by transferring the motion of a vertical cylinder to the paddlewheel shaft through an elevated rocking beam (Gardiner 1993a:183). Their placement on ocean steamships caused concern among some engineers; water could get into the engine room during high seas and the height and weight of the walking beam would cause the ship to be unstable (Gardiner 1993a:161; Bowers 1999:168). The engine placed in the *Brother Jonathan* had a somewhat unusual history. In late 1846, the steamship *Atlantic* sank in a storm in Long Island Sound. The *Atlantic*'s engine was salvaged, renovated, and placed in the *Brother Jonathan*'s new hull. Superstition considered it bad luck to have anything on a new ship that had already seen the ocean floor, especially something as important as an engine. Though it was a common practice to save money on the construction, the superstition could lead to a depression in ticket sales. Therefore, most owners, including Mills, did not advertise the fact that they reused pieces salvaged from such a well publicized shipwreck. The news about the *Brother Jonathan*'s engine did not appear in newspapers until after it wrecked in 1865 (Bowers 1999:168 n.2).

The relationship to the nautical archaeology world comes full circle with the excavation of this crate. One of the victims of the *Atlantic* disaster was the Rev. Dr. William Jessup Armstrong. His great-great-grandson is Dr. George Bass, distinguished professor emeritus at Texas A&M University, founder of the Institute of Nautical Archaeology, and is considered the "grandfather of nautical archaeology" (Eastlund 2004).

The Panama Route

Edward Mills owned the New York and Chagres Express Line and the *Brother Jonathan*'s first trip left New York in early 1851 headed for Chagres, Panama; ships headed for Panama had homeports in either New York or New Orleans. Despite the name "Express," the trip to Chagres was not as fast as it implied. Before 1852, many of the steamers leaving from New York would make multiple stops prior to their arrival in Panama and Nicaragua; these ports included the southern towns of Charleston, South Carolina, Savannah, Georgia, and Havana, Cuba (Kemble 1990:146). With every trip, even after 1852, steamers stopped at Kingston, Jamaica to refuel; this is where the *Brother Jonathan* took on more coal during its maiden voyage. After 1852, the steamship companies changed their policy to take the most direct route to Panama, which dramatically decreased the amount of time at sea. On the Pacific side of the route, before 1851, the boats often stopped at Acapulco, San Blas, Mazatlán, San Diego, and Monterey on their way to San Francisco; this trip could take upward of 21 days (Kemble 1990:147). However, after 1851, they quit making as many stops and only made port when necessary for refueling at Acapulco or Manzanillo; this reduced the travel time to as few as 11 days, but each trip was scheduled for 14 days (Kemble 1990:148). During the early stages of the gold rush the travel time from New York to San Francisco was 33 to 35 days. However, by the middle to late 1850s, the trip only took 21 to 28 days. The alternative water route to California was on a sailing ship around Cape Horn; however, this route was often the longest, taking well over three months.

The gold rush in California was in full swing in 1851 and Mills built the *Brother Jonathan* expressly to service this need. The route to and across Panama was the fastest way to reach the gold mines. While it was the most expensive route, it was more comfortable than riding in a wagon across the country and safer, as well as faster, than sailing around Cape Horn.

Over the centuries, Central America established several paths to the Pacific from the Caribbean Sea; Panama was the shortest and the most popular, though it held many dangers for the travelers. The first danger occurred when the ships reached the harbor at Chagres on the eastern side of Panama; there were two miles of dangerous waters to get through in small boats. Passengers often rode on the backs of natives the last few yards to shore. The town of Chagres, where the steamboats dropped off their charges, was notorious. Many insurance companies would void policies if a person were to spend a single night in this pit of infestation (Folkman 1972:2). Travel through Panama was fraught with swamps, bugs, and very little supplies in the middle of the route. Several small towns along the passage sprang up quickly to service the needs of the travelers. Before the railroad was built in 1855 across the isthmus, travel was difficult and often expensive. Many people were not used to the climate of the tropics and the Pacific side of the gold rush movement was fraught with death after passing through Panama. The most common ailments were cholera and “Panama Fever”; this was a was a catch-all name for many ailments, but was probably malaria in most cases (Kemble 1990:163). Daily funerals were common on Pacific steamers as they headed north from Panama. Despite the sickness and death, the voyage west was one of hope. Heinrich Schliemann, the well known archaeologist and discoverer of the famed city of Troy in Turkey, noted, during his trip back to New York, the differences on board between people headed toward California and those going home to the east. People were excited and enthusiastic to get to California, while those headed home were often weary and downtrodden with disappointment (Delgado 1990:72-73).

There were other problems with the crossings; Edward Mills, as well as the *Brother Jonathan* and the New York and Chagres Express Line, encountered a few of their own dilemmas. Mills and his line sold inexpensive tickets to gold-seekers that were good all the way to San Francisco. He set up a deal with the Empire City Line to transport his passengers on the western leg of the trip, from Panama to San Francisco (Walker 1999). Several incidents occurred to Mills’ passengers when they reached the Pacific side of the isthmus. The major problem was that when passengers reached the Pacific, their connecting steamer was late or failed to arrive. One instance involved the

S.S. Union. On the way south, the entire crew drank too much during a 4 July celebration and ran the *Union* onto a sandbar (Bowers 1999:175-176). The passengers waiting in Panama were left to find a new passage to San Francisco. On another occasion, the *S.S. Monumental City* did not appear as promised and there was no news of it; the *S.S. Monumental City* was a known slow sailor, but the passengers had no information on the arrival. In both instances, the Pacific Mail Steamship Company, Mills' chief competitor, refused to honor the tickets that his company sold to *Brother Jonathan* passengers; the extremely cheap fares were not compatible with their fares. The New York and Chagres Steamship Company declined to refund any portion of the tickets for the stranded passengers waiting for the *Union*. However, due to customer unrest, the passengers from the *Monumental City* affair received a $70 refund on their $110 fare (Bowers 1999:176).

This was not a problem unique to Mills' company. If a connecting steamer failed to show up, very often another company would not accept the competitor's ticket, sometimes due to a difference in rates, but often due to overcrowding of their ships with their own passengers. The issuing company frequently refused a refund or only granted a small portion of the ticket. Many gold seekers spent all their money on tickets west; it was difficult for them to find funds to live in Panama for extended periods or to buy a new ticket on another steamer. Some men found passage by making a deal with the steamship companies; they would work one and a half round trips for their fare to San Francisco.

The Nicaragua Route

The *Brother Jonathan*'s career on the Atlantic ended shortly after its launch in 1850. In March 1852, Mills sold the vessel to Cornelius "Commodore" Vanderbilt and the Accessory Transit Line. Vanderbilt was a self-made millionaire who obtained much of his money in the transportation industry. He purchased the *Brother Jonathan* with the purpose to send it to the Pacific coast where it would run the other side of the gold rush route. He started the Accessory Transit Line in direct competition to the United States Mail Steamship Company and the Pacific Mail Steamship Company. Vanderbilt's passengers crossed the isthmus in Nicaragua where he had plans to build a canal. Before it sailed over, the new owner had the vessel refurbished to hold more passengers. The most valuable cargo, the one with the greatest profit, was, and always has been, people. Vanderbilt wanted to take advantage of this and had the *Brother Jonathan* refitted to hold up to 750 passengers, more than twice its original capacity. Changes included the addition of a mizzenmast, expansion of the smoke stack, which moved closer to the paddlewheels, and elimination of the clipper-style bowsprit (Bowers 1999:178). Even though Vanderbilt was known for his dirty and overcrowded ships, the revamped *Brother Jonathan* was lauded for its elegance (Bowers 1999:178). The "new" vessel left New York on 14 May 1852, to make the trip around Cape Horn. In the Pacific, the *Brother Jonathan* worked the route from San Francisco to San Juan del Sud, Nicaragua.

The Nicaragua route was the alternative to Panama. Due to the increased competition of steamship companies in Panama, Vanderbilt took his ships to Nicaragua and created a monopoly in that area. The Panama route was 50 miles while it was almost 200 across Nicaragua; however Nicaragua was an easier crossing. A small river steamer picked up passengers from the eastern steamship when it reached San Juan del Norte. The river steamers took the passengers part way up the San Juan River. Due to several sets of rapids, small local canoes, called bongos, carried passengers a portion of the 121 miles up the river. Vanderbilt eventually built a small railroad next to the largest set of falls to make the movement of passengers and cargo easier. The second leg of the crossing was 56 miles across Lake Nicaragua in another small steamer to Virgin Bay. The gold seekers then hiked 12 miles, with all of their belongings, to San Juan del Sud where they boarded the ocean steamboat for the last leg of their journey (Folkman 1972:30). During the initial survey, the company hoped that the crossing would only take 36 hours; however in reality, the crossing always took six to eight days (Folkman 1972:23). Vanderbilt advertised heavily against the Panama route. He claimed that the passage through Nicaragua had a healthier climate, an abundance of provisions, and cheaper transportation (Folkman 1972:7). The total traveling distance through Nicaragua was less than going through Panama, 4871 miles to 5245 miles. While the Nicaragua isthmus was longer, most of the travel was over water through the San Juan River and Lake Nicaragua; only 18 miles was across land. Vanderbilt advertised it as a healthier crossing since it was more mountainous and therefore had cooler temperatures (Kemble 1990:58-59).

Though the *Brother Jonathan* had no problems during its time on this route, it was a spectator to at least one famous shipwreck. Speed was obviously important; the boat that claimed to be the fastest was more likely to sell tickets. The S.S. *Yankee*

Blade's destruction can be traced back to this defining factor. In 1854, Vanderbilt, who owned this ship, offered a large bonus to the captain if he could get a new speed record with the *Yankee Blade* (Belyk 2001:8). To achieve this, the captain chose a course closer to the shoreline and it proved to be his downfall. A submerged rock pierced the boat in route to San Juan del Sud and the crew was unable to keep the ship afloat. Many of the passengers were saved and made it to shore. The *Brother Jonathan* was passing in the area, picked up the stranded people who had been headed home to the east coast, and took them back to San Francisco. Steamship companies were obviously not known for their customer service. The passengers had just gone through a shipwreck and were now in the city where they started their passage; the Independent Steamship Company only gave them a 25% refund on their ticket (Bowers 1999:198). The steamship companies were in business to make money, and during this time, keeping customers happy was not a priority; there was enough traffic to keep them all in business. The service they were providing was not one that often had repeat customers. Many of the gold seekers chose to stay in California and those that did return east did not usually venture west again.

After running the route between Nicaragua and California for many years, opportunities in this area diminished. The political situation within the Company as well as within Nicaragua led to the demise of this route. On 31 December 1852, Vanderbilt transferred the title of the *Brother Jonathan* to the Accessory Transit Line with which he had a monetary interest. Over the next few years, control of the company changed hands from Vanderbilt to Charles Morgan and Cornelius K. Garrison back to Vanderbilt. During this turmoil, a United States political extremist took control of Nicaragua, aided by Morgan and Garrison. The end results were that the Accessory Transit Line's contract for exclusive rights to crossing Nicaragua was cancelled and the route never reopened (Larkin 1988:403). The *Brother Jonathan* played a minor role in these proceedings; it was the last Vanderbilt steamship to leave the Pacific side of Nicaragua after nullification of the contract in 1855 (Kemble 1990:74).

San Francisco

San Francisco, the destination of so many people, was a major component of the western maritime merchant trade network. The editor of the daily newspaper, *Alta California*, in 1865, claimed that San Francisco was the second or third most important port in the United States (Bowers 1999:216). During the gold rush, the small trading outpost very quickly grew into a small city. Out of necessity, trade as well as manufacturing facilities developed. Before this, all manufactured goods had to be shipped in, leading to greatly inflated prices. The harbor was constantly full of ships, as San Francisco was the homeport for any vessel working the Pacific coast of North America.

The merchant trade of San Francisco was more than steamships and these other boats added, as well, to the foundation of the city. Many sailing ships left the east coast during the gold rush and set course for San Francisco via Cape Horn. For those who did not have the money to make the isthmus crossing, this was the desired route. Due to high demand, many derelict ships were revived to make one last voyage. Very often, men eager to get to the gold fields and with no money to buy passage would enlist as sailors on these ships. Unfortunately, they would all leave the ship once it reached San

Francisco; very often, even the captain would abandon his ship for the gold fields. Because of this trend, the government passed a law in the late 19th century that made it illegal for a sailor to abandon his ship (Gould 2000:251). It came to be that there were hundreds of abandoned vessels in San Francisco harbor. By June 1850, there were more than 500 laid up ships; these included almost every type of sailing vessel that cruised the seas during this time: schooners, whalers, Chinese junks, lorchas, Mediterranean feluccas, and galliots (Gibbs 1986:12-13; Delgado 1990:24). Not all of these ships were left to rot and sink into the harbor. Some were taken apart and the timber was used for new buildings. Several were removed from the harbor and used for fill in newly established roads. A number of them were demasted and held in place with pilings; these semi-permanent fixtures became stores, warehouses, housing, and even the first San Francisco jail, *Euphemia* (Gibbs 1986:13). In 1851, there were 148 store ships moored in the San Francisco harbor. Much information about the young San Francisco has been gleaned from the excavations of several warehouse ships, including the *Niantic*, the *William Gray*, and the *Roma* (Delgado 1997b:297; 1997c:404). The stores included anything and everything that could ever be wanted or needed in this blossoming town. The *Niantic*, which burned and finally sank in May 1851, contained stationery, printing materials, firearms, tools, furnishings, food, cases of champagne, ceramics, and barrels and crates full of goods (Delgado 1997b:297).

The Gold Rush at Fraser River

In November 1857, the Accessory Transit Line sold the *Brother Jonathan* to John T. Wright and the Merchants Accommodation Line. Wright renamed the ship

Commodore; this was another sign of bad luck since seafaring superstition says that it is bad luck to rename any vessel. The name *Commodore* was for the former owner, Cornelius Vanderbilt. His name was synonymous with cheap rates. The owners were hoping that people thought, by the name, that they were buying a cheap ticket. During the vessel's career with this new line, it was employed in coastal trading in California, the Oregon Territory, the Washington Territory, and into British Columbia. The British had only opened this route in 1849, finally allowing foreign merchants to trade in their territories (Rowland 1970:118). With the opening of the port at Victoria "a change in the center of gravity of the transportation system [in Canada] was caused by the increase of shipping on the Pacific" (Glazebrook 1938:228). The *Commodore* thrived on this route due to increased gold fever.

The discovery of gold in British Columbia actually occurred as early as 1850; however, local residents were able to keep that information quiet. Before the announcement, British Columbia only had isolated colonies of European immigrants (Barman 1996:61). In 1858, local control of the information was lost (Barman 1996:63). The *Commodore* brought news of gold in the Fraser River to San Francisco, and a new rush was on. The trip to British Columbia was easiest by sea, more specifically, by steamer. The overland route was difficult; the U.S. Army's wars with the Indians blocked travel through the Washington Territory (Barman 1996:65).

Once it announced that gold had been found in British Columbia, there was no stopping the rush of people. Unlike the California gold rush, British Columbia was a short trip away; many of the miners came from California and it only took a few days to get there by ship. It was a cheaper and more feasible trip. In 1855, there were 79 residences and 12 shops in Victoria; within 6 weeks of the announcement in San Francisco, it had increased to include over 200 buildings (Barman 1996:61, 65). The booming town included merchants, clothiers, auctioneers, barbers, and schools. However, the influx of 30,000 people by August 1858 did not last. Within one year, only 3,000 of the migrants remained in British Columbia (Bancroft 1887:358). Several qualities of the Fraser River find contributed to the massive migration back to California. First, as has already been stated, it was a short trip and easily made; many men choose to go back to their families and established homes in California rather than start over for a third time. Second, and perhaps more importantly, the find at Fraser River was not even a fraction of what had been found in California; many of the miners were disappointed and had no reason to stay in the area. The Fraser River find yielded $3 million per year from 1858-1868, while California produced $40 million per year (Barman 1996:62).

The fact that the *Commodore* brought the news of gold in British Columbia left her in the perfect position for further trading in the northwest; it was one of the first ships to leave San Francisco for Victoria after it delivered the news (Bowers 1999:201-202). Tickets for travelers were only $25 to $50, a feasible fare with the prospect of gold ahead. While running this route, the *Commodore* had its first serious mishap. In July 1858, with over 300 passengers aboard, heavy weather caused the holds to flood which put out the fires under the boilers. This brought the boat to a complete standstill. Much of the deck cargo was thrown overboard and everyone, including the passengers, began to bail. They were able to clear the hold and restart the fires. The ship steamed back to San Francisco and the Merchants Accommodation Line fully refunded every ticket, at a cost of over $12,000 (Bowers 1999:202-203). It seems unusual for a steamship line to refund, fully, the ticket price for every passenger. Many examples exist where ships were involved in accidents, lives were lost, and the company refused to refund any of the ticket prices. Due to the damage and the expensive refund, this proved to be the last trip for the ship under the name *Commodore*.

A New Look, Name, and Route

In December 1858, the California Steam Navigation Company purchased the *Commodore* for $40,000. The new owners changed the name back to *Brother Jonathan* and put it in dry dock for a complete overhaul. The name change reflects an antipathy felt towards Cornelius Vanderbilt and his style of business. His ships were known for being dirty, foul, overcrowded, and the service was often lacking. The new owners believed that the name *Commodore* gave the boat a negative image. While in dry dock, the vessel received new copper sheathing below the water line, shipbuilders replaced more than 5,000 iron bolts, and they repaired key structural pieces. The California Steam Navigation Company primarily focused on trade in the riverine systems; the *Brother Jonathan* was one of their first ventures into costal trading. They put the ship back onto its old route, running between San Francisco and Victoria. However, soon the California Steam Navigation Company decided to maintain their focus on inland water trade and leave the ocean to others (Bowers 1999:204).

On 7 August 1860, the *Brother Jonathan* was sold to Samuel J. Hensley and the Oregon & San Diego Steamship Company along with the *Senator*; the price of the two vessels was $200,000. Hensley put the ship into service, retaining San Francisco as the homeport. However, instead of sailing north as it had done under the last two owners, Hensley sent it south. The stopping ports for *Brother Jonathan* in this new career were San Luis Obispo, Santa Barbara, San Pedro (later to be called Los Angeles), and San Diego (Bowers 1999:204).

In 1861, Hensley had the *Brother Jonathan* hauled out again and began an extensive renovation. The *Alta California* described the improvements as “shipbuilding” and “altogether the most costly and important yet attempted in California” (Bowers 1999:204). Carpenters stripped the vessel to the floors and lower futtocks, and then added all new planking. Many other improvements were made: the superstructure was strengthened, the decking and interior were replaced, the number of decks was reduced to two, a false keel was added, the masts were strengthened, and the foremast was moved forward (Bowers 1999:204). The newly renovated ship was re-launched on 14 December 1861, amid many watchful eyes; on the first sea trial, there was a small impromptu race, where the *Brother Jonathan* beat the Sacramento steamer *New World*, despite the ocean vessel’s old engine (Bowers 1999:205). The “new” ship was exactly what the owner intended it to be. No longer was there a need to transport 750 passengers. There was a much greater need for cargo capacity. With one less deck, the weight of the ship was less, while the cargo area stayed the same. The reported tonnage of the renovated vessel was 1180 tons, a figure reported at the *Brother Jonathan*’s launch in secondary sources. The *Brother Jonathan* could now carry about 250 passengers and hold up to 900 tons of cargo; the new arrangement was better suited to loading and unloading as well. The priorities of shipping had changed; Vanderbilt knew that in the early 1850s the money was in people, while, in the 1860s the need was for shipment of goods to the northwest of North America.

During this period of the *Brother Jonathan*'s life, the Civil War was waged fiercely in the east from 1861 to 1865. California was a divided state; there was even discussion in the state legislature of splitting the state into two separate entities; the federal government did not want that, as it would throw off the balance of power (Bowers 1999:207). This does not mean that the western merchant trade did not have to worry. The steamers on the west coast were wary, if not afraid, of Confederate raiders; many stories circulated about their cruelty to northeastern merchant ships. The *C.S.S. Alabama* attacked the *S.S. Ariel* in the Atlantic while it was steaming toward New York. Vanderbilt owned the *Ariel*; he was still involved in the transatlantic shipping business (Kemble 1990:110-111). Being one of their own, the steamship captains were nervous when anyone made mention of a raider on the west coast. The *C.S.S. Shenandoah* was known to be prowling the waters of the Pacific off the United States. It ravaged the whaling fleet in the North Pacific, burning every ship it captured, except the occasional ones used to carry prisoners to shore. Luckily, it never managed to do any great harm to the steamship merchantmen; the merchant worries were for naught.

The Growing Northwest Town

Although Hensley retained ownership, the California Steam Navigation Company, where he was a trustee, continued the daily operations (Bowers 1999:206). After the re-launch, the *Brother Jonathan* again worked the northern service to Oregon, the Washington Territory, and British Columbia. The normal voyage carried 150 to 200 passengers and a full complement of cargo. Portland was the delivery point of the majority of passengers and cargo. The needs of this growing city included: iron machinery, Chinese goods, furniture, appliances, hardware, building supplies, wine, musical instruments, mining machinery, chemicals, clothing, and food (Bowers 1999:206). Like San Francisco in the beginning of the gold rush, Portland was just beginning to blossom as a city and had no manufacturing of its own. All processed goods were shipped in. Meanwhile, Oregon shipped the raw materials that it produced back to San Francisco and, consequently, the world; these included: gold, wool, foodstuffs, and lumber (Bowers 1999:206).

All of the northwestern towns of North America were similar to San Francisco, before the gold rush, and Portland, as just described. They were not established, had no manufacturing facilities of their own, and required all goods necessary for living, except for the few raw materials found locally, such as lumber. Several archaeological sources demonstrate how few materials were found in these areas; everything needed had to be shipped in.

The Western Rivers

Some of the more prominent archaeological sites are western river steamboats. While these ships are different in build, their purpose is the same, to assist in the development in the Midwest. Their finds can be directly compared to those found on the *Brother Jonathan*.

The Missouri River provided a route westward into the interior for goods being shipped to new towns in Montana where gold had also been found. The *Arabia*, which sank on the Missouri River on 5 September 1856, near modern Kansas City, went down with a cargo of tools, firearms, clothing, boots, hats, bottled foods, liquor, ceramics, hardware, and textiles (Delgado 1997a:32). The *Bertrand*, which sank on 1 April 1865, just a few miles from the *Arabia*, had been partially salvaged directly after it sank (Petsche 1974:5-6; Harmon 1979:10-11). However, there was still a wide variety of cargo in the hold. It also contained everything that settlers would need: foodstuffs, liquors, patent medicines, textiles, sewing supplies, household goods, mining supplies, hardware, tools, and building supplies; these were discovered when it was excavated in 1968 (Petsche 1974:32, 43-73). The *Bertrand* also contained many luxury goods, including brandied peaches, oysters, men's suits, and fancy scarves (Petsche 1974:43-73). Harmon described the *Bertrand* find as follows; "The cargo is a cross section of the necessities and luxuries demanded by a frontier community whose desires were stimulated by an abundance of gold" (1979:12) The *Brother Jonathan* itself carried many items for everyday life. Though not properly excavated, many of the known finds are similar to previously recorded cargos. It has yielded many glass medicinal bottles, champagne bottles, ceramics, a leather boot, and several large crates of goods (Delgado 1995; R2 Underwater Consultants 1997:15-20). Thus far, it appears that these crates contain general goods, those for building, outfitting a house, and outfitting a kitchen.

Like San Francisco in the beginning, due to shipping costs, as well as demand, the cost of many of these items in the northwest were enormous. Those settlers who were not there for gold, or who did not find it and decided to stay, often did not have the funds to purchase basic necessities. For example, Henry Crease was fired from his job in England and the only job that he could find to support his growing family was in British Columbia. Because of this, the Crease's were living in two countries on a very tight budget. When Sarah Crease and her children left England to join her husband in Victoria, the prices were so high that she decided it was cheaper to ship her entire English household, rather than try to furnish her house with new items (Bridge 1996:66).

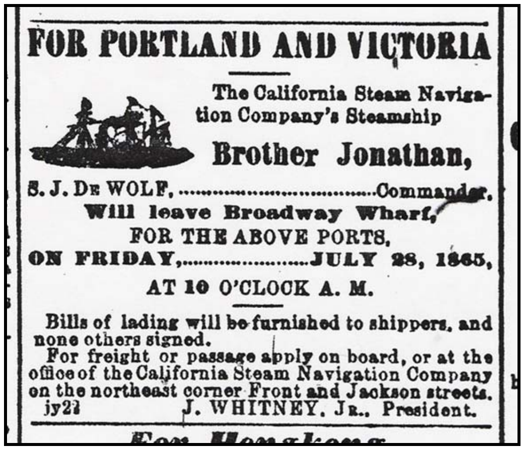
During this time, one of the most important items that ships carried was information and news. During the gold rush, the steamers brought some reports from the East; however, the news was usually three to four weeks old. Most of the news reached California by Pony Express from St. Louis where they had a telegraph; however, it was still up to ten days old (Bancroft 1890:281). Once the *Brother Jonathan* started sailing to the north, it was one of the primary news carriers, being just as fast as the Pony Express. As has been previously mentioned, it brought the news of the gold finds at Fraser River in British Columbia to San Francisco. This vessel also brought the news to Portland of Oregon's statehood on 5 March 1859, which had been ratified in Congress on 14 February 1859 (Bowers 1999:221). Just as during the gold rush, there was always a large group of people waiting at the wharf for ships to come in and deliver their loved ones, their ordered goods, and the news. This practice would continue until telegraphs were set up along the western coast of North America.

Brother Jonathan's Demise

In early July 1865, the steamer had its second, and most serious, accident. While cruising down the Columbia River, the *Brother Jonathan* passed two moored ships, the brig *Sunny* and the barquentine *Jane A. Falkenburg*. It is unclear exactly what happened, but the *Brother Jonathan* had a small collision with the *Jane A. Falkenburg*. At the time, those aboard did not believe that it caused any great damage to the ship. Norman Smith, a passenger, later recalled that the hole poked in the bow slightly above the water line was temporarily patched (Bowers 1999:245 n.2). Captain DeWolf planned to have the ship hauled when they returned to San Francisco to make proper repairs and check for further damage.

Unfortunately, DeWolf never got the chance to confirm his ship's strength. After completing the trip to Victoria and then back to San Francisco, it seems that the boat was slightly behind schedule. There was no time to pull the ship out of the water since cargo had piled up at the dock. One advertisement said that the *Brother Jonathan* would be leaving San Francisco on 26 July 1865 (Walker 1999). However, the *Daily Alta* let the public know on 22 July and every day after that the ship would be departing 28 July at 10 AM (Figure 2.1) (Bowers 1999:253).

One of the advantages that steamships had over sailing ships since their introduction was their ability to keep a schedule. However, through time, these schedules could and would fall behind by a day or two. The *Tennessee*, when it was leaving New York in 1849 for the Pacific, was five days late, causing the 100 people originally scheduled for the trip around Cape Horn to give up hope and take passage in other vessels; only 15 people sailed when it finally left (Delgado 1985:40-41).


FOR PORTLAND AND VICTORIA

The California Steam Navigation Company's Steamship

Brother Jonathan,

S. J. De WOLF, ...Commander.

Will leave Broadway Wharf,

FOR THE ABOVE PORTS,

ON FRIDAY,......................JULY 28, 1865,

AT 10 O'CLOCK A. M.

Bills of lading will be furnished to shippers, and none others signed.

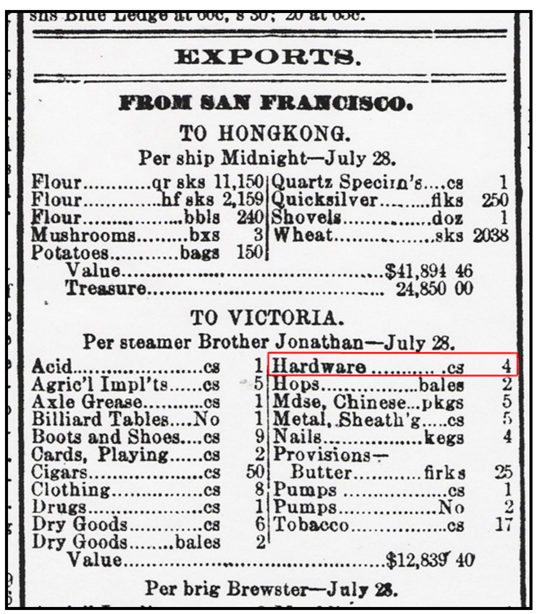
For freight or passage apply on board, or at the office of the California Steam Navigation Company on the northeast corner Front and Jackson streets.

jy22 J. WHITNEY, Jr., President.

Figure 2.1: Advertisement for the sailing of the *Brother Jonathan* from the *Daily Alta* on 22 July 1865 (1865d:2).

On 27 July the cargo master was finishing up the loading of the *Brother Jonathan*; there was an excess of cargo and the master had accepted more than the ship could technically hold. The influx of outgoing cargo was due to the lingering effects of the Civil War. The raider C.S.S. *Shenandoah* had not yet learned of the surrender at Appomattox, Virginia, and there was still fear in San Francisco. Merchants and ship owners did not want take many risks with their goods and ships. Because of this, cargo was piling up on the wharf, waiting for the *Brother Jonathan* when it returned.

The actual amount of cargo shipped on the *Brother Jonathan* on its last voyage is under some debate. The long-believed story is that the vessel was overburdened; supposedly, the cargo agent accepted too much weight for the ship and insisted on loading it. Captain DeWolf threatened to quit if he continued to overload it. DeWolf was worried about two possibilities: one, the hole in the hull caused by the collision with the *Jane A. Falkenburg* and, two, a 200-ton ore crusher that was part of the cargo was placed in the depths of the hold forward, near the recent scar. After DeWolf threatened to quit, the cargo agent called his bluff and said he could easily hire another captain. DeWolf told his story to a friend before the ship left port; the friend proceeded to tell newspapers DeWolf's story after the ship sank. Reports include that the ship was so heavy it could not proceed out of the harbor and had to wait until the afternoon high tide to leave San Francisco (Walker 1999). Every source on the *Brother Jonathan* relays the previous facts and attributes the overloading of the ship as a high factor in the sinking. However, the author of the only in-depth book on this vessel and all aspects relating to it, Q. David Bowers, believes that there is no evidence that the ship was overloaded. The newspaper only listed goods that measured up to 500 tons (Figure 2.2).



EXPORTS.

FROM SAN FRANCISCO.

TO HONGKONG.

Per ship Midnight—July 28.

Flour	qr sks	11,150	Quartz Specim's	cs	1
Flour	hf sks	2,159	Quicksilver	flks	250
Flour	bbls	240	Shovels	doz	1
Mushrooms	bxs	3	Wheat	sks	2038
Potatoes	bags	150			

Value $41,894 46
Treasure 24,850 00

TO VICTORIA.

Per steamer Brother Jonathan—July 28.

Acid	cs	1	Hardware	cs	4
Agric'l Impl'ts	cs	5	Hops	bales	2
Axle Grease	cs	1	Mdse, Chinese	pkgs	5
Billiard Tables	No	1	Metal, Sheath'g	cs	5
Boots and Shoes	cs	9	Nails	kegs	4
Cards, Playing	cs	2	Provisions—		
Cigars	cs	50	Butter	firks	25
Clothing	cs	8	Pumps	cs	1
Drugs	cs	1	Pumps	No	2
Dry Goods	cs	6	Tobacco	cs	17
Dry Goods	bales	2			

Value $12,839 40

Per brig Brewster—July 28.

Figure 2.2: *Daily Alta* list of goods transported on the *Brother Jonathan* (1865c:4).

The findings of a government inquiry did not determine that the cargo master overfilled the ship (Bowers 1999:256-257). This is an argument that needs to be made in another forum. More research needs to be done on this matter, as Bowers' arguments are not fully supported.

After leaving San Francisco 28 July 1865, the *Brother Jonathan* made a stop in Crescent City, just on the California side of the California and Oregon border. Then, on 30 July at nine in the morning, the ship headed back out to sea facing a large storm. DeWolf decided that the best course, after two hours of being tossed around, was to turn the ship around and return to Crescent City to wait out the bad weather. Around 2 pm, the mate went forward to ready the anchor chain for their arrival; he looked in front of the ship and shouted to the captain and helmsman. Yet, it was too late; the *Brother Jonathan* rode up a wave and fell on an uncharted rock just below the surface. The ore crusher in the bow immediately fell through the hull to the bottom of the sea, 250 feet down. There were reports that pieces of the keel floated up next to the boat; it sank in 45 minutes with a large loss of life. Only 19 to 21 people of the over 250 on board made it back to shore alive. There is no agreement of the number of passengers and crew that were on the *Brother Jonathan*. It was common practice for people to board a ship right before it left the dock and then they did not buy their ticket until well out to sea. Those names would never show up on a passenger manifest.

The loss of a ship at any time is a great tragedy, especially when the loss of life is as great as it was on the *Brother Jonathan*. Nevertheless, the life of this particular boat was long and prosperous. Many ships from the gold rush era never made it out of their infancy in the Pacific (Delgado 1990:144).

The *Brother Jonathan* not only was important in the gold rush on both sides of the continent, but also had a long life after the rush of people from the east was over. This steamer touched many settlements on the west coast, from San Diego to Victoria. It carried everything from people to gold to San Francisco and then onto British Columbia. All the while, it carried more people, news, and valuable, necessary goods to those who lived there or were waiting to strike it rich.

CHAPTER III

THE HARDWARE CAPITAL OF THE WORLD

The study of the *Brother Jonathan* crate calls into view the sharp contrast between the development of California and that of Connecticut. While California developed very quickly due to one major event and was populated and settled within a ten-year time span, Connecticut developed gradually; New Britain, the town of interest, took over 200 years to become a full fledged city. There is no one defining moment in the settlement of Connecticut like the gold rush was for California; each region of Connecticut was shaped by several minor events that advanced its development.

This chapter will offer a brief outline of the area's history, including the beginning of the Russell and Erwin Manufacturing Company and the men involved in that venture. Several authors have provided excellent in-depth histories of New Britain and the surrounding areas, and there are extensive primary documents for this region. While other historians have used church, school, and library records to formulate this area's earliest history, this chapter will rely extensively on company records

New Britain History

New Britain, for a long time, had few settlers and little to no economy, as there was not much to lend itself to prosperity. Land in the area was hilly, swampy, and had rocky soil; to illustrate that point, the area was widely known in the late 17th and early 18th centuries as "the Great Swamp" (Fowler 1960:6). There were no rivers to power mills, as at nearby Farmington, and most major roads bypassed the New Britain area (Thibodeau 1989:7-9).

The first settlers moved to the area in the 1660s. It was a wild country with little to offer in the way of amenities. For the first 40 years, parishioners had to walk eight to ten miles every Sunday to Farmington to go to church. Berlin, the “mother town” in the New Britain area, was granted a parish in 1701; New Britain was finally given the right to establish its own church in 1754 (White 1903:7-9). Connecticut was set up in boroughs with Berlin being the center town and New Britain was one of three smaller villages. The New Britain area remained primarily agricultural until the early 1800s; its main exports were lumber and agricultural surplus. These products were sent to Boston, New York, or the West Indies in exchange for sugar, molasses, and cloth (Camp 1889:262). Some of the first shopkeepers were farmers who had adopted a second occupation that often turned into their primary trade; many of the initial shops and mills were founded to fulfill the needs of the town (Fowler 1960:56).

The War of 1812 was the most defining event for this small town. Due to the war, the young nation was cut off from their main supplier of manufactured goods, Europe; because of this, many towns were forced to manufacture their own provisions. Some of the first small shops in New Britain were formed at this time (Camp 1889:59). The town was ripe for these changes due to a series of developments that had occurred during the previous three decades.

Citizens of New Britain Involved in Manufacturing

Edward and William Pattison

Edward Pattison established himself as the first tinsmith in Berlin in 1740 (Larson 1975:10). At that time, people often had to travel up 12 miles to reach a store containing supplies they needed. Pattison was in business with his brother William; together, they realized that the easiest way to reach the largest number of customers in this widespread area was to take their wares town-to-town and house-to-house. William became the first "Yankee Peddler" trading in the greater Berlin area. The peddlers were ingenious because they not only sold wares but they had personal contact with customers and could therefore determine which goods were in highest demand. The Pattisons also helped develop merchandising and manufacturing outposts throughout New England (Larson 1975:11). The Pattison brothers quickly recognized the profitability in selling other goods in addition to their tin wares. The peddlers began carrying iron items made by James North, Sr., a blacksmith in New Britain; he manufactured 25 different small pieces of hardware, including knee and shoe buckles, andirons, shovels, and tongs (White 1903:11; Fowler 1960:51,54).

Seth J. North

Seth J. North is considered the father and founder of New Britain by many contemporaries and historians alike. His family had been in the area since the beginning; John North was one of the first settlers in Farmington, and his grandson, Thomas North, Jr., moved to the "Great Swamp" of New Britain. Thomas North, Jr.'s grandson was James North, Sr., father to Seth North and blacksmith for the Pattisons (White 1903:11). Seth was born in 1779 and expanded upon the business knowledge given to him by his father. James North, Sr. realized the potential for manufacturing and encouraged his sons to learn a variety of trades. James North, Jr. was sent to Massachusetts to learn how to smith brass, and consequently, returned to New Britain to establish a successful sleigh bell business, the first in the United States (Van Slyck 1879:519; Fowler 1960:45). William North, another son, became a silversmith and started a wire and jewelry shop (Fowler 1960:60). Seth North apprenticed under his father to learn the trade of blacksmithing. James North, Sr. foresaw a large and profitable market in manufacturing small items that could easily be carried by traveling peddlers. He, furthermore, ensured that each of his sons were able to sell wares without being in direct competition with each other. Seth North is the one who made the most of the opportunities that his father afforded him and began to put New Britain on the map as the hardware city. In 1812, he formed the North and Judd Company. Profits from this business and his father's peddlers were so substantial that, in 1829, Seth built one of the first factories in New Britain. It was four stories tall and the first to use horsepower on a regular basis (Thibodeau 1989:21).

Manufacturing in New Britain progressed rapidly after that. Several important families were involved over the next 50 years during the formation of New Britain as the "Hardware Capital of the World". These families include the Harts, Judds, Stanleys, Corbins, and, of course, the Norths; while many of these family names are not renowned today, the Stanleys were the founders of Stanley Tools, the same company that makes tools today. Many of these families were intermarried; Seth North's niece married Cornelius Erwin and his son-in-law was Henry Stanley (Camp 1889:490; Larson 1975:12). Yet, with all of these well known families in the hardware trade that had been living in the area for years, it was two new-comers, Henry Russell and Cornelius Erwin, who changed the face of the town in the middle 19th century.

Population Growth in New Britain

The rapid development of New Britain over the next 50 years into a major industrial town was dependant on one factor - rail transportation. Railroads made it easy to import the raw materials and fuel required to manufacture finished goods. These goods were then shipped out on the trains to buyers all over the country. In 1850, an east-west line was finally placed directly through New Britain thanks to the efforts of Seth North, Cornelius Erwin, and Fred Stanley; it is still in use today (Larson 1975:52).

With this influx of business, the village of New Britain began to overtake the other two villages, Kenstington and Worthington, with which it was aligned. In 1850, the citizens of New Britain petitioned to become an independent town. At this time, the town boasted 3,026 citizens to the 1,870 in the other two villages combined (Larson 1975:13). New Britain, the town, developed rapidly due to the leadership of some of its most prominent citizens. Within ten years the town possessed one of the nation's earliest water systems, established a free library, planned a major public park, seen the incorporation of several major businesses (including the Russell and Erwin Manufacturing Company), and established one of the earliest free high schools in the state (Larson 1975:13).

The year New Britain became an independent town, there were 68 businesses listed on the New Britain Register. Twenty-three of them were on the assessor's roll for more than $2,000 (Fowler 1960:70). Four of the most prominent, and vital to New Britain's economy, were Stanley Works; Landers, Frary & Clark (the largest makers of table cutlery in the world); P&F Corbin (P. Corbin started his career at Matteson, Russell & Co.); and Russell and Erwin (White 1903:36).

The rapid development of New Britain, a direct result of Seth North's guidance, can be seen in the census records of the early- to mid-19th century. In 1754, there were less than 300 residents of New Britain. By 1820, there were still less than 1,000 people living in the village. Thirty years later, the census records of 1850 show a population of 3,029 (Camp 1889:83; Fowler 1960:54). The influence of the Russell and Erwin Manufacturing Company can been seen in the dramatic increase from 1850-1870. In 1860, New Britain had 5,385 residents while Berlin, the "mother town" had only 2,145 (Fowler 1960:79). Over the next ten years, the population of New Britain nearly doubled from 5,212 in 1860 to 9,480 in 1870 (Thibodeau 1989:28). This extreme expansion can be seen in the hiring records of the Russell and Erwin Manufacturing Company. In 1851, the year they incorporated, the Russell & Erwin Manufacturing Company employed 300 citizens from the town of 3,029 people. By the mid 1870s they employed 2,600, and in 1899 their employee roster numbered 8,019 (Thibodeau 1989:44). In 1913, American Hardware Company (the result of Russell and Erwin Manufacturing Company combining with P&F Corbin Company) employed over 12,000 persons and was the largest employer in the state of Connecticut (Thibodeau 1989:48).

Russell & Erwin Manufacturing Company

The early history of the Russell and Erwin Manufacturing Company is complicated. The first company on the site of the future corporation was Stanley, Woodruff, and Co., founded in 1835. The first evidence of the Russells' involvement in the New Britain manufacturing business was when Henry Russell's father, Emanuel Russell, became one of the original investors (Van Slyck 1879:517). In 1839, the Woodruffs and W.B. Stanley retired, Emanuel turned his interest over to his son, Henry Russell, and Cornelius Erwin became an active partner; the firm then became known as Stanley, Russell, and Co. (Van Slyck 1879:518). In 1840, F.T. Stanley sold out to his partners and they reorganized to Messrs. Russell, Erwin, and Mattison. Then, in 1841, it became Mattison, Russell, and Co. in a five year limited partnership. In September 1841 Mattison died but his estate retained his interest until the end of the contract (Van Slyck 1879:519). In 1846, when the partnership was over, Russell joined with Cornelius Erwin again to form Russell and Erwin. They purchased the New Britain Lock Factory, one of the oldest manufactories in New Britain, constructed in 1835 by Stanley, Woodruff, & Co., (Camp 1889:283; Fowler 1960:59). In 1850, Russell and Erwin bought a few small companies including North and Stanley, and William H. Smith, both in New Britain, and the Albany Argillo Works in Albany, NY (makers of doorknobs) (White 1903:22). In 1851, they decided to incorporate to form Russell and Erwin Manufacturing Company, a joint stock company with capital of $125,000 (Camp 1889:358).

Over the years varying amounts of initial capital have been reported by different historians of the company: $125,000, $150,000, and $200,000 (*New Britain Record* 1866; Van Slyck 1879:520; Camp 1889:358). The true amount was found in the company records of incorporation along with the list of initial investors. Seven men invested a total of $125,000 in the Russell & Erwin Manufacturing Company; there were

5,000 shares of stock at $25 a share. Investors included Henry Russell, Cornelius Erwin, Henry Stanley and Co., Emit P. Post, William H. Smith, Issac D. Russell (Henry's older brother), and Horace Eddy (Russell and Erwin Manufacturing Company 1851:3-4). The two primary investors were H. Russell and Erwin with 1,360 shares apiece. After the frequent shifts within the various companies during the previous 16 years, the Russell and Erwin Manufacturing Company was now established and set. It would retain this name until they combined with P&F Corbin Company to form the American Hardware Company in 1902.

This was the first joint stock incorporation in New Britain (Thibodeau 1989:44). Russell and Erwin Manufacturing Co. was a company that definitely started small; Stanley, Woodruff and Co., started with capital of only $18,000 (White 1903:22). Since its incorporation, Russell and Erwin Manufacturing Company managed to remain at the top of the pack. The Stanley Works incorporated one year later in 1852 with only $30,000 of stock. P&F Corbin incorporated two years later in 1853 with $50,000 in joint stock issued (Fowler 1960:77). Russell and Erwin Manufacturing Company remained the largest and most important manufacturer in New Britain until the late 1800s.

The success of Russell & Erwin Manufacturing Company had much to do with their wide range of small, inexpensive products. They produced hardware that they could manufacture in a small facility with a minimum of raw materials and little waste. Because the products were small, transportation to a variety of markets was easy and cheap.

Cornelius Erwin

Of the two founders, Cornelius Erwin's life is chronicled in greater detail, due in part to his high level of involvement in the town of New Britain and some of its various institutions. He was born in Boonville, New York, on 11 June 1811. He first traveled to Connecticut at the age of 21 with a consignment of horses and $5 in his pocket; while there, he found it very easy to obtain work (White 1903:24). His first job was as an ordinary workman at North and Stanley, the same company that he purchased in 1850 (Van Slyck 1879:518). His first investment was as a junior partner in Belden, Lee & Co., in 1835 (Van Slyck 1879:518). In 1836, just four years after he arrived in New Britain, he married Maria North, the daughter of James North, Jr. and niece of Seth North (Larson 1975:12). That same year he helped establish Erwin, Lewis, & Co. with capital from William H. Smith and George Lewis (Van Slyck 1879:518; Larson 1975:53). This company struggled under the depression of 1837; their excess merchandise forced Erwin to travel south to sell inventory in the winters of 1837-8 and 1838-9 (Van Slyck 1879:518). On 1 January 1839, he joined Stanley, Russell & Co. With the incorporation of Russell & Erwin Manufacturing Company in 1851, Erwin was elected its first president and remained in that post until his death in 1885. Despite failing health and deteriorating vision toward the end of his life, Erwin managed to remain active in the daily operation of the company. Henry Russell, Jr., Russell's nephew, was Erwin's right hand man at the end of his life, assisting him in his daily activities and managing the factory (Sloper 1949:296).

Erwin was one of New Britain’s most prominent citizens, helping to establish the New Britain National Bank, The New Britain Institute, and Walnut Hill Park (Figure 3.1). He was a proponent of “utopian socialism”, the belief that those that can should give money and time to start, maintain, and improve public institutions, including colleges, libraries, and museums (Larson 1975:38).

Figure 3.1: The New Britain Institute. *Photography by C. Sowden.*

Erwin and his wife, Maria, had no children, so, upon his death, he left his $1.1 million estate to four colleges as well several New Britain institutions including the South Congregational Church (Larson 1975:38).

Erwin was also active in the business community of New Britain. By the time he died, Erwin was a major stockholder and board member in many of the local companies, including: New Britain National Bank, Savings Bank, American Hosiery Company, The Stanley Works, Stanley Rules and Level Co., Landers, Frary, & Clark, Union Works, Phoenix Fire Insurance Company, Travelers Insurance Co., Connecticut General Life

Insurance Co., and Hartford Trust Co (Sloper 1949:102). Even though he was president of Russell & Erwin Manufacturing Company, he maintained knowledge and personal interest in his competitors.

Henry Russell

Henry Russell was also an outsider to the New Britain area. He was born in Litchfield, Connecticut on 6 April 1816 (Van Slyck 1879:518). He only attended school until age 11 and then spent time working in his father's store until he was 16 (Van Slyck 1879:518). His father, Emanuel Russell, moved the family to New York City in 1835 (Camp 1889:456). Henry Russell moved to New Britain from New York in 1839 when he was 24 to take over his father's share in the Stanley, Woodruff, and Co. (Van Slyck 1879:518; Sloper 1949:293). Unlike Erwin, who came to New Britain on a whim with nothing to his name, Russell arrived in New Britain with a job and eight years of experience in wholesale and retail sales (Sloper 1949:293). During most of his tenure at Russell and Erwin Manufacturing Company, Henry Russell led a dual life. He was elected both treasurer and secretary at the first board meeting. However, he was soon sent off to manage the New York warehouse and maintained two households, one in New York and one in New Britain. The estate in New Britain was the largest residential property in the area (Sloper 1949:293). In 1880, Russell moved to New York City permanently, in an attempt to retire, and Henry Russell, Jr., his nephew, was appointed secretary and treasurer of the company (Sloper 1949:296). After Erwin died in 1885, Russell, Sr. was elected president but chose to stay in New York, leaving his nephew to manage the large production facility in New Britain (Sloper 1949:296). He remained president until his death in 1895 (Hennessy 1976:37). Russell, Jr., was an excellent choice to replace his uncle, as he knew the company well. He started in the New York warehouse in 1851 at the age 13 and moved to New Britain to work in the manufactory in 1863, (Van Slyck 1879:522; Hennessy 1976:36). In 1872, he was elected secretary of the company and helped Erwin in his later years as he was going blind (Van Slyck 1879:522; Sloper 1949:296).

Business Expansion

The company's initial market focus was New York City; it was in close proximity to New Britain and was one corner of the cotton trade triangle along with Liverpool, England and New Orleans, Louisiana. They first sold their products in 1839 through commission stores. However, they soon realized that the main interest of these stores was not consigned products. Actually, Mattison, Russell and Co. was the first business to establish the warehouse in New York between 1841 and 1845 (Van Slyck 1879:519). This facility was maintained through the successive two companies prior to becoming the property of Russell and Erwin Manufacturing Company. Russell moved to New York, opened the warehouse, and managed sales in that area; his experience as a young man working for his father made him the ideal person to run the warehouse (Connecticut Tercentenary 1935, 10). With an independent warehouse, the company now had the ability to take on other commissioned sales, sometimes buying out the entire line (Van Slyck 1879:519). With their products in New York City, Russell and Erwin Manufacturing Company distributed to the south in Charleston, Savannah, and

Mobile. It is also likely that they had buyers in England near Le Haver and Liverpool where the cotton route picked up raw materials and immigrants (Larson 1975:53).

The company suffered its first serious loss at the beginning of the Civil War, during which the company lost $100,000 owed by southern merchants with the secession of the southern states (Thibodeau 1989:28). However, many northern companies, possibly including Russell and Erwin Manufacturing Company, were awarded defense related contracts during the war; which made up for the loss of income (Thibodeau 1989:28).

Despite this setback, Russell and Erwin Manufacturing Company continued to grow and expand. It quickly became necessary to increase the amount of capital in the business. On 6 March 1851, just two and a half months after incorporation, they increased it to $150,000; on 29 September of the same year, it was again increased to $200,000 (Van Slyck 1879:520). It remained at $200,000 until 10 February 1864; at that time they more than doubled their capital to $500,000. This was done for three specific reasons; first, "Russell + Erwin Mfg Co have established a Warehouse in San Francisco Cal." (Figure 3.2). Second, "it [is] necessary to employ an increased number of men of ability and capacity to conduct and manage such increase of business". Third,

> the value of the service of the men in the employ of the Co. depends very much upon the fidelity + permanincy with which such service is rendered, both of which, it is thoughy will be more surely secured + continued by their becoming personally interested in the success of this business of the Co. by their being stockholders to a greater or les extent (Russell and Erwin Manufacturing Company 1864).

Twelve thousand shares of stock were sold for $25 per share, bringing the company total to 20,000 shares. Investors included Henry Russell and 33 other individuals, estates, and businesses. Interestingly, Cornelius Erwin was not one of the stockholders who invested in the capital increase. However, several members of both the North and Stanley families were investors, as involvement in your competitors was considered smart business.

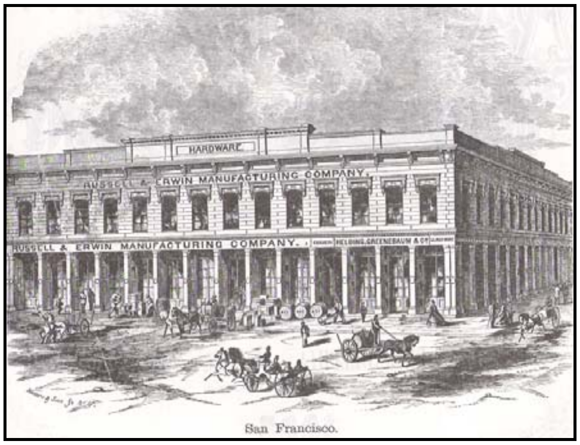


Figure 3.2: Illustration of the Russell and Erwin Manufacturing Company's warehouse in San Francisco, California (Russell and Erwin Manufacturing Company 1865:iii).

In addition to the one in New York, the company owned other warehouses in Philadelphia, Baltimore, London, New Orleans, Boston, and San Francisco (*New Britain Record* 1866; New Britain Daily News 1900). Little is known about the San Francisco warehouse since it was likely destroyed in the great earthquake and fire in 1906. This is the division that is of most interest for the *Brother Jonathan* crate since the goods found in that crate were almost certainly shipped out of the Russell and Erwin Manufacturing Company's warehouse in San Francisco on 28 July 1865. The *Brother Jonathan* was listed as having four cases of hardware for export out of San Francisco (Figure 2.2) (Daily Alta 1865c:4). The San Francisco paper, the *Daily Alta* kept a good record of all ships coming into harbor and those leaving and what each one was carrying. The Russell and Erwin Manufacturing Company were consignees on shipments coming into San Francisco every week to ten days (Daily Alta 1865b:4; 1865a:4).

Demise

The downfall of the Russell & Erwin Manufacturing Company came after the deaths of its founders. By the time of Erwin's death in 1885, the hardware manufactured by the Russell and Erwin Manufacturing Company was "the best to be had" (Sloper 1949:298). At the time of Russell's death in 1895, Russell and Erwin Manufacturing Company was "probably the largest single hardware manufacturing company in the world" (White 1903:22). However, the new generation of executives became haughty and neglected their customers. They were overly confident in the company's reputation and forgot that it was the customers that made them successful. Also, they neglected to monitor to rival companies in the community (Sloper 1949:299-300). This attitude eventually led to the necessity of the company's merger with P&F Corbin Company to form the American Hardware Company in 1902. The American Hardware became part of the Emhart Corporation which was dissolved in 1989 when it merged with Black & Decker. The Russell and Erwin Manufacturing Company's section of the American Hardware Company became known for their locks. They began selling under the brand name Russwin; the brand is now known as Corbin Russwin and is owned by YSG Door Security, the parent company of Yale Locks (YSG Door Security Consultants 2006).

Catalogs

The Russell & Erwin Manufacturing Company's printed trade catalog proved to be a critical tool in researching the manufactured goods found in the *Brother Jonathan* crate. Catalogs aid in the identification of objects, provide an overview of the material culture of the period, illustrate the needs of the people, and reveal the manufacturing practices. Engraved pattern books were first seen in Italy and Germany in the 15th and 16th centuries (Nelson 1980:iii). The English improved upon this concept and one of the earliest dates to 1770 in Birmingham. A comparable American catalog, however, was not produced until the second quarter of the 19th century, as Americans relied on English manufactured goods (Nelson 1980:iii, viii). In the late 18th century, Americans were only producing very rough hardware, often using wooden substitutes and purchasing the majority of iron goods from the English (Nelson 1980:vii).

As discussed earlier, in the United States, the hardware industry was centered in Connecticut, and Russell and Erwin Manufacturing Company was the industry leader. To stay on top, they needed a way to promote their product to a wide range of shops, and they accomplished this through the use of catalogs. The earliest Russell and Erwin catalog on record in the Local History Room at the New Britain Public Library dates to 1847, four years before incorporation; it had 22 pages.

These early catalogs were produced for the retailer. They were often covered with handwritten notes of discounts and other deals. In some cases, the prices were hand marked, indicating that there was a sliding price scale depending on the customer. It could also indicate that the catalogs were used over several years; the blank spaces provided the manufacturer the opportunity to raise prices as costs increased.

In 1864, the Russell and Erwin Manufacturing Company published a 116 page catalog. This was followed by a 436 page catalog published in 1865 which had over 3,000 illustrations. It was the largest, most prolific catalog seen to date and set the standard for all the other hardware manufacturing companies (Figure 3.3). The first 113 pages of the 1865 catalog were identical to those of the 1864 catalog (Nelson 1980:ix-x). Russell and Erwin Manufacturing Company did not increase their product line in 1865; rather, the first 113 pages showcase items made by the company, while the remaining pages listed items taken on by consignment.

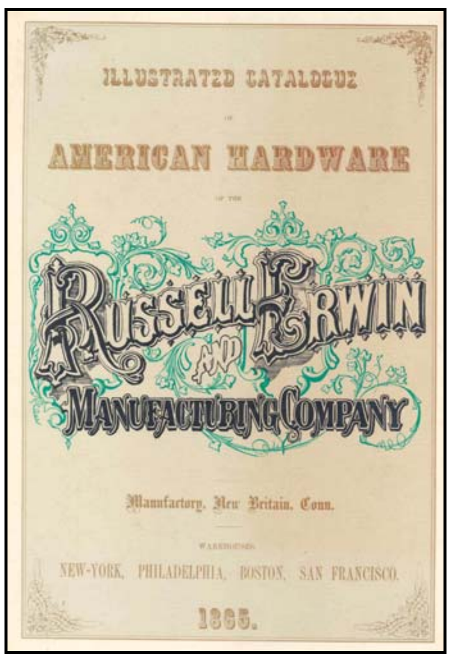


Figure 3.3: Cover of the 1865 Russell and Erwin Manufacturing Company’s 436 page catalog.

Of the five catalogs that were located, 1849, 1860, 1865, 1866, and 1874, only the 1865 version lacked any printed prices; the other four had some pre-printed prices. Once an item was introduced, the engraved illustrations did not change throughout that item's availability. The other major difference between the 1865 catalog and those of other years was size. The 1847 catalog was quite small, almost pocket size; the other three fit nicely on a bookshelf. The leather bound 1865 catalog found in the Local History Room of the New Britain Public Library, on the contrary, was very large (11 1/2" x 16 3/4"), and appears to be a special edition as it had the initials "CE" embossed in gold on the front cover. While librarian of the Local History Room in the New Britain Public Library could not confirm the origin of this catalog, it is very possible that it was Cornelius Erwin's personal copy.

The 1865 catalog is crucial to the study of the *Brother Jonathan* crate. Although it was published in April 1865, it is likely that the merchant who ordered the crate did not see the catalog in time to have a shipment leave San Francisco by July that year. However, many of the items had been previously published. Every artifact contained in the crate is illustrated in the 1865 catalog. The catalog illustration for each artifact is presented in Appendix A.

CHAPTER IV

EXCAVATION AND CONSERVATION

The Brother Jonathan crate arrived at the Conservation Research Laboratory (CRL) at Texas A&M University in Bryan, Texas on 17 October 2000. Once lab space and web camera preparations were completed excavation procedures began in mid January 2001. The goals of this project were to: identify the contents of the crate, determine how the crate was packed, evaluate the condition of each artifact, and devise a conservation treatment for each. This chapter carefully describes the excavation procedure and conservation technique used for each group of artifacts. They are described in the chapter in the approximate order in which they were removed from the crate.

Throughout the conservation, a web camera documented the excavation and allowed the world at large to view the process. As artifacts are removed, they were stored in individual 5% sodium sesquicarbonate baths to retard further decomposition.

An electric lifting hoist and water pump system was devised so one excavator/conservator could lift the crate and work on the box with no additional help while keeping the entire crate wet. A large stainless steel vat containing 5% sodium sesquicarbonate in tap water stored the crate when work was not being preformed. The crate sat on a fiberglass grate; while work was on-going, the grate sat on two-2x4's that stretched across the vat. Attached to the grate were four straps that connected to a steel frame suspended from an electric chain hoist directly over the vat (Figure 4.1). This allowed one person to easily lift and lower the crate for work. When out of the vat, a small pump kept the vat solution constantly running over the crate. To help with documentation, a web camera was installed over the vat, a white vinyl curtain was installed behind the vat, and daylight balance fluorescent lights were installed over the vat. The camera streamed ongoing work onto the web (http://nautarch.tamu.edu/crl/report12/motion320.htm), and at prescribed intervals saved images on the laboratory computer (Figure 4.2).

Figure 4.1: Crate with steel container and lifting hoist. *Photography by C. Sowden*.

Artifact numbers were assigned in the order in which they are discovered. The pre-fix for all numbers is BJ-17, which derived from the crate's field number that was initially designated by its founders, BJ-00-0017. Following the prefix are the arbitrarily assigned lot numbers, if there was more than one item within a lot, then each item was designated by a decimal point and then its identifying number. For example, the third axe that was removed from the box was designated BJ-17-5.3.

Figure 4.2: Image capture from the web camera of the author working on the *Brother Jonathan* crate.

The sides were arbitrarily given designations of north, south, east, and west. Since the crate was initially positioned in the vat so the most interesting side faced the web camera, and since in plan view, north is often to the top, the interesting side (the side with the axe handles) was labeled south. In the lab notes these are sometimes referred to Face A, B, C, D, facing the crate going counter clockwise. A associates with south, B with east, C with north, and D with west. The crate was left laying on the surface as it was received at the CRL. The upper surface turned out to be the bottom of the crate, so as the excavation proceeded, the first items placed in the crate were the items first exposed and removed. Thus, the crate was excavated from the bottom to the top.

Figure 4.3: The crate as it arrived at the CRL. Note the badly damaged wood exterior. *Photography by A. Borgens.*

Figure 4.4: Solder from the interior tin lining of the crate. *Photography by A. Borgens.*

The crate, itself, retains very few diagnostic qualities. The wood (BJ-17-1), identified as *Juniperus virginiana* (eastern red-cedar), is riddled with toredo worms and it is impossible to tell the exact length, width, or height of the planks (Figure 4.3) (West 2002). Beneath the wood, there was a tin lining (BJ-17-2.1). The tin no longer exists, just a thin corrosion layer remains, but the lead seams of the tin sheets are very apparent.

The tin pieces were joined with a lead solder (BJ-17-2.2) (Figure 4.4). Each seam was carefully documented and then cleaned with HCl and sealed in microcrystalline wax (Hamilton 1996:104).

Axes

Twelve hafted, fawn-footed iron axes in two groups of six were discovered stacked on top of each other on the south side of the box, with the heads against the east side (BJ-17-5 and BJ-17-6) (See Appendix E). The heads of the axes were wrapped in paper to protect the blades; however, the iron corroded away entirely (Figure 4.5). It was possible to make silicone rubber (RTV) casts of the interior of the paper package and a replica head was created from the molds and impressions in two-part epoxy. The casts revealed a two part head, a hand forged head with a steel bit inserted as the cutting edge.

Figure 4.5: Axes BJ-17-05 (on top) and BJ-17-06 in the crate. *Photography by A. Borgens.*

The heads were stacked cutting edge to poll and wrapped accordion style with paper, six to a package. String was tied around the package just below the base of the heads. The axes were also tied at the base of the handles, helping to make a complete and easy to maneuver unit. The first six axe handles were removed individually; the second six were removed as a package. Silicone rubber casts were made of all the heads as the packages were disassembled to insure complete information for reconstruction.

After removal, each wood handle was carefully cleaned of any adhering iron corrosion products and concretion. The wood handle was never identified, but often, axe handles were crafted from ash. They were placed in a tap water bath that was changed often to facilitate desalination. The process was completed with successive baths of deionized (DI) water until there were minimal chlorides remaining.

There are several accepted methods for wood conservation; the axe handles, as well as the other tool handles recovered in the crate were conserved using the acetone-rosin method. The nature of the artifacts determines the treatment; the tool handles were complete objects and needed little manipulation after conservation. The aforementioned acetone-rosin method leaves a very rigid artifact with a pleasing golden wood color (McKerrell et al. 1972; Hamilton 1996:29-30).

The handles went through a lengthy chemical dehydration consisting of 10 baths of six weeks each: 25% ethanol/75% DI water, 50% ethanol/50% DI water, 75% ethanol/25% DI water, 2 baths of 100% ethanol, 25% acetone/75% ethanol, 50% acetone/50% ethanol, 75% acetone/ 25% ethanol, and 2 baths of 100% acetone. The handles were placed in a sealed container with a saturated solution of pine rosin in acetone. The literature suggests heating the rosin solution, but since this took place during the summer months in Texas, the natural environment created enough heat to make an acceptable room-temperature saturated solution. As suggested, there was thick sludge layer of undissolved rosin in the bottom of the container (McKerrell et al. 1972). The handles were suspended in the solution by placing them on a modified plastic bread rack positioned inside the container; the rack was supported on empty glass baby food bottles and the handles were set on top of the rack. They were turned every few weeks to make sure that the area sitting directly on the rack was given access to the rosin.

Due to the artifacts' size as well as their excellent state of preservation, the acetone-rosin process was chosen because of the excellent penetration of rosin into hardwoods and because it is quick. The handles were removed within three months of initial immersion, but probably needed less time than that. Once removed, the handles

Figure 4.6: Three axe handles conserved using the acetone-rosin method. *Photography by J. Swanson.*

were quickly wiped down with fresh acetone to make sure there was no adhering surface rosin. They were then placed in a sealed plastic bag and allowed to dry for a week. Finally, the handles were carefully cleaned using dental tools and scalpels to remove any adhering concretion (Figure 4.6). The treatment resulted in a well-consolidated, light-colored wood.

Large Door Sheaves

The *Brother Jonathan* crate had ten packages of brass and cast iron sliding door and cast iron shutter sheaves. Six of the packages are large sheaves made for sliding or pocket doors. The packages were discovered in two groups of three. The first three packages (BJ-17-20, BJ-17-21, and BJ-17-22) sat north of the axe heads (See Appendix E). The second three packages (BJ-17-30, BJ-17-31, and BJ-17-32) were discovered in the far northwest corner, the length along the north edge and the width along the west edges. BJ-17-30 sat in the corner; the other two were behind it down the west side.

The first package, BJ-17-20, was too damaged to remove as a single unit; each of the four sheaves was removed singly. Some samples of the paper were retained for testing and conservation. The other five packages were removed as individual units.

The packages were wrapped in a heavy paper, most likely a waxed paper, similar to today's butcher paper (Figure 4.7). Items being transported over sea, especially iron, were protected from the dampness and salt of that environment with waxed paper. The paper was tied with string, one wrap along its length and two around the width.

Inside the package, each single sheave was wrapped in a much lighter weight paper (Figure 4.8). The center two sheaves are stacked together in the same orientation.

The outer two sheaves are upside down in comparison to the center two. All six packages were wrapped and situated this way.

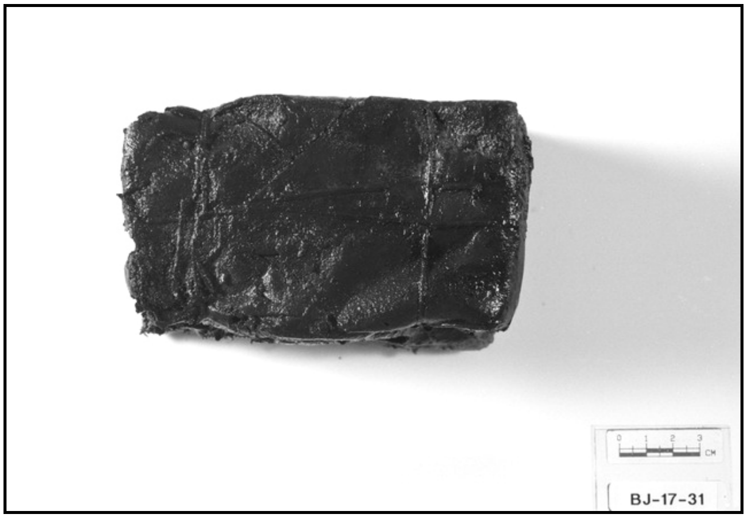


Figure 4.7: Large sheave package BJ-17-31 prior to conservation. *Photography by A. Borgens.*

Figure 4.8: Three sheaves from BJ-17-20. The two lower ones show the light weight interior wrapping paper. *Photography by C. Sowden.*

After excavation, several of the packages were x-rayed to identify the contents. The X-rays revealed a construction consisting of cast iron sheave casings and spoked wheels, with brass pins holding the door sheaves together. The conservation procedures were designed to care for both metals.

Two different methods were used to conserve the sheaves; the first method tested, conserving the paper with the sheaves still wrapped, was considered too time consuming and added no value to the end results. The decision was made to attempt to conserve the wrapping paper first while using the sheaves to help hold the shape of the package, thus the first set of sheaves (BJ-17-20.3, BJ-17-20.4, BJ-17-20.5, and BJ-17-21) was treated in their paper wrapping using silicone oil. This was done to better preserve the paper and shape of the package before attempting to conserve the cast iron sheaves. The silicone oil process is excellent for organics of all kind, but had never been tried on archaeological paper. The paper itself was fragile and tended to tear easily when wet. By leaving the sheaves in the paper during conservation, it guaranteed a better chance of survival for the paper. The sheaves would help maintain the paper's shape until the end of the silicone oil treatment; after that point, the paper would be strong enough to retain its own shape. This process was carried out on one complete package (BJ-17-21), two individual sheaves still in the interior paper (BJ-17-20.3 and BJ-17-20.4), and one unwrapped sheave as a control subject (BJ-17-20.5).

The silicone oil process was developed at Texas A&M University primarily to conserve water logged organic artifacts. It begins with the same dehydration process as the acetone-rosin treatment. The silicone oil uses acetone as a gateway into the organic cells, so it is necessary to be completely saturated in 100% acetone for effective treatment. Thirty-five percent methyl trimethoxysilane (MTMS), a cross-linker, is added to the silicone oil. Once the solution is prepared, a small amount of the catalyst, dibutyl-tin diacetate (DBDTA), is added to the silicone oil in a clean room to confirm its viability. The packages were then immersed in the solution for several weeks. After removal and draining of the package, surface cleaning could begin. Once clean, the silicone polymerized in the paper with the addition of the catalyst dibutyl-tin diacetate (DBDTA) (Smith 2003). While stronger after conservation, the paper was still very fragile and did not separate from the sheaves easily. The result was a few large pieces and many small pieces that needed to be pieced together to recreate the package.

Once the sheaves were removed from the silicone oil bath, the paper was carefully cut off the sheaves and their conservation could continue. The sheaves were soaked in MTMS and then ethanol to help remove as much silicone oil as possible; they were never exposed to the catalyst, DBDTA. Previous studies have not shown silicone oil to be effective for the conservation of marine iron, but it doesn't appear to have any adverse affects (Klosowski et al. 2000).

Since the silicone oil process is not suitable for removing the contaminating iron chloride corrosion products from iron artifacts, the iron and brass sheaves still needed to be conserved. Due to their fragile nature and lack of a solid iron core, the sodium sulfite process was used (Gilberg and Seeley 1982; Hamilton 1996:79-80). This procedure proved to be ideal for all of the cast iron artifacts in the *Brother Jonathan* crate. Each object was in immaculate condition; however, they were mostly graphite with a very small iron core, only detectable by the strongest magnets.

The sodium sulfite process uses a chemical reducing agent, sodium sulfite. The key behind this process is to carry it out in a heated, air tight environment. Each artifact went through at least three treatments of sodium sulfite. The first two baths used tap water, while the final bath used DI water and low chloride content sodium hydroxide. The solution was created using hot water to help dissolve the sodium sulfite. The complete solution was 0.5M of sodium hydroxide (NaOH) and 0.5M of sodium sulfite. A lidded plastic container was used and over filled. Once the artifacts were in the container, it was sealed with the lid and seal was insured with duct tape. This helped keep the air out of the container. The artifacts were kept in an oven heated to 60°C for one month. At the end of the month, the artifacts were carefully washed and cleaned of any loose concretion. At the end of the third bath, the artifacts went through a lengthy, careful rinsing process. Regularly, artifacts would have been rinsed in a boiling bath, however, this was found to be too active for the fragile cast iron, so they were rinsed in successive cool DI water baths. Once the rinsing was completed, the procedure was followed up by an application of three coats of 20% tannic acid and sealing with microcrystalline wax (Hamilton 1996:80-81, 85-87). The exposure to silicone oil while treating the paper does not appear to have affected either the cast iron or brass parts of the sheaves.

The second set of sheaves (BJ-17-20.6, BJ-17-22, BJ-17-30, BJ-17-31, and BJ-17-32) was not pre-treated in silicone oil; they were carefully cut out of their paper wrapping prior to any treatment. After the first set was finished, it was decided that a better use of time and energies would be to record each package and then carefully cut the paper off the sheaves. The heavy outer packaging was cut at the edges resulting in six pieces of layered paper for each package. This way each side can be conserved using the silicone oil treatment and then reconstructed without the difficulty of trying to remove it after treatment. The interior paper was also cut off; however, it seems unlikely that many good representations will be available at the end of conservation. The paper is so thin that those that have already been conserved are still very fragile and susceptible to tears and punctures when cleaning.

The second set of sheaves, BJ-17-22, 30, 31, 32, and one sheave from BJ-17-20.6, were conserved using just the sodium sulfide process. There is little difference between the results of the sheaves that were pre-treated with silicone oil and those that were not. The ones pre-treated in SI oil seemed to be slightly more fragile and broke into more pieces during the sodium sulfite treatment. Due to the breaking, all of the brass center rotation pins were removed from this set of sheaves during the sodium sulfite treatments. It was decided to finish the conservation of the brass pins with the standard electrolytic reduction (ER) treatment, described in the plumb bob section. The sheaves done only in sodium sulfite did not break up enough to remove the brass pins.

Those that did not have the brass pins removed were treated as a whole in sodium sulfite only; it was feared that any ER treatment would destroy the iron. After several hot and cold rinses in DI water, the artifacts were slowly air dried. The exposed ends of the rotation point were carefully cleaned with a sodium bicarbonate paste and fiberglass brushes. Three coats of 2% BTA in ethanol were painted on each end with cotton swabs (Madsen 1967, 1971). A shield was made of Mylar to protect the iron portion of the artifact as each side of the rotation point was sprayed with Krylon. Once that was dry, both faces of the brass centers were covered with masking tape to shield it from tannic acid. The sheaves were painted three times with 20% tannic acid. After the third application, the tape was removed from the faces of the brass center and the entire artifact was coated in microcrystalline wax (Hamilton 1996:80-87).

The broken sheave casings and wheels were pieced back together and glued using superglue (Loctite 409). The super gluing process took place at several different steps during the process. Some were glued together prior to coating with tannic acid. However, the heat of the wax broke many of these joints. So, several repairs were made after the waxing process. While this is not ideal, the wax does not make for a strong bond with the super glue, it does present a good final product for a museum display.

Plumb Bobs

One package of brass plumb bobs (BJ-17-24) was recovered from the top layer, between the scythe package located to furthest to the north, the meat grinder on the east side, and the group of large sheave packages located along the east edge (See Appendix E). The first observation after excavation was that the package was noticeably heavier than anything else previously excavated. After x-raying the package, it was discovered to be brass plumb bobs with iron points.

This was the first package where silicone oil was used to conserve the entire package. It was chosen for two reasons. First, the package was one of the most complete excavated to date when the process began. Second, since brass is one of the most stable metals from a saltwater environment, it is known that the silicone oil would not have a detrimental effect on it as there would be minimal corrosion products on the metal and any subsequent treatment of the brass would remove the silicone oil.

Once the package was removed from silicone oil, it was cleaned and the unpacking process began (Figure 4.9).

Figure 4.9: Plumb bob package, BJ-17-24, after the silicone oil process. *Photography by A. Borgens.*

Since this was the first package, it was thought that the best manner of unpacking would be to try to open the package along the original fold lines (Figure 4.10). This did not work as well as expected. The package ended up in several large pieces with many small fragments and a gaping hole that was patched with new butcher paper. Since this experience did not achieve the desired results, the paper from the first set of silicone-oil treated sheaves was carefully cut off.

Figure 4.10: Unpacking BJ-17-24. *Photography by A. Borgens.*

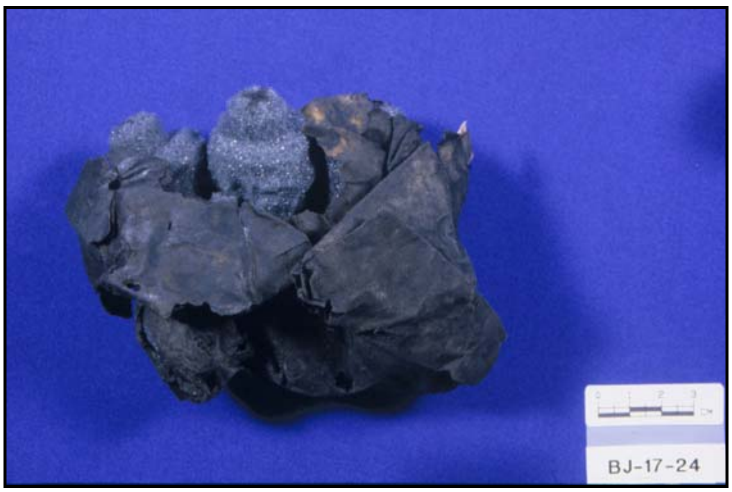


Figure 4.11: Reconstructed paper package of BJ-17-24. *Photography by A. Borgens.*

Torn pieces of paper were attached using butcher paper as a bridge; the butcher paper was glued to the artifact paper with glue (Loctite 407). The shape of the package is maintained with carved foam replicas of the plumb bobs (Figure 4.11).

Once the plumb bobs were removed, they were cleaned with MTMS and ethanol to remove as much of the silicone oil as possible; they were never exposed to the catalyst, DBDTA. It would not be desirable for the oil to crosslink; that would make it more difficult to remove from the surface of the metal. The plumb bobs were placed into electrolytic reduction (ER) upon their removal from the package which effectively removed the silicone oil. The electrolyte was 2% sodium hydroxide (NaOH) and the electrical current was set to five volts and two to three amperes. The electrolyte was tested regularly for chloride content; when the chlorides leveled off, the electrolyte was replaced. This process continued until there were minimal chlorides left (7 ppm) (Hamilton 1996:56-79, 92). Electrolytic reduction of brass normally does not take long for complete stabilization; for objects this size, one would expect them to take only a few weeks for the metal to be reduced and the chlorides removed. However, these plumb bobs remained in ER for ten months. Initially it was believed to be due to the pre-treatment in silicone oil. Once they were removed from ER, the real reason became known; the plumb bobs have an iron center with a sheet of brass as an outer coat. The iron center accounts for the seemingly excessive time in ER to reduce the chloride levels.

After removing the plumb bobs from ER, they were boiled for three days in deionized water to remove any excess electrolyte residue. Before they were sealed, the plumb bobs were stored in ethanol so that there would be no exposure to water that could be in the air in the form of vapor. Each plumb bob was removed from the alcohol and polished with a paste of sodium bicarbonate (baking soda) and ethanol. After the darkest areas of tarnish were removed, they were submerged in 10% formic acid for 10 seconds and then rinsed in water. Once completely dry, they were rubbed with soft fiberglass brushes. This process was repeated several times until the desired patina was achieved.

Due to the composite nature of the artifacts, we decided to seal them twice. First they were immersed for 24 hours in a bath of 2% benzotriazole (BTA) in ethanol. Second, to maintain a barrier between the iron and the air, they were sealed in microcrystalline wax.

Several interesting features of the plumb bobs were observed after polishing (Figure 4.12). First, there is at least one seam down the axis of each plumb bob; some appear to have two. Second, there are tool marks on the brass at the base where the iron tip would have protruded. Manufacturing techniques for plumb bobs explains both of these features. The manufacturer started with an iron core and then had one or maybe two sheets of brass that he would lay down over the center. The seam comes from the meeting of the edges of the sheet of brass; the seam was probably an interlocking one so the brass would not separate during the tool's life. The tool marks at the base are from the maker pushing down the edge of the brass to fit flush with the core and expose the iron tip.

The top half of the plumb bobs appears to have been painted or marked. The upper portions of the plumb bobs are dark and show brush marks. The marks are uneven and skewed differently between the six plumb bobs. It is unknown what this mark could be for.

Figure 4.12: Plumb bob, BJ-17-24. Note the tool marks at the tip of the plumb bob and the seam down the center. *Photography by J. Swanson.*

Meat Grinders

Four cast iron meat grinders were recovered from the top layer of the crate, two large (BJ-17-9 and BJ-17-25) and two small (BJ-17-26 and BJ-17-27). The first large one was packed in the northeast corner with the stuffer pointed toward the south. The rest were in the same orientation along the north side; the large ones in the northeast corner, and two smaller ones directly west of them (See Appendix E). The second small one (BJ-17-27) was next to the second group of packages of large sheaves. Each one was carefully packed in with packing material of pine needles (BJ-17-11) and wood shavings (BJ-17-10) all around. The majority of the packing material was found around the grinders, perhaps due to the fact that they were one of the few artifacts not protected in paper.

Because the matrix of the packing material was soft, removal of the grinders was very easy. Starting with the grinder in the northeast corner, BJ-17-9, the material was cleaned from around it and then the grinder was carefully lifted away.

The packing material was cleaned off the exterior of the grinder; this allowed for a thin tool to be worked into the edge where the two halves of the grinder casing met. Careful cleaning of this space allowed the top to separate from the bottom. Surprisingly, the interior of the grinders was very clean, no concretion and no packing material. Inside were two grooved rollers that meshed with each other to grind; only a single small grinder (BJ-17-27) showed evidence of the steel blade that sat in a groove down the center of the base (Figure 4.13). The knife blade served to sever in half any meat passed over it as it was ground by the grooved rollers.

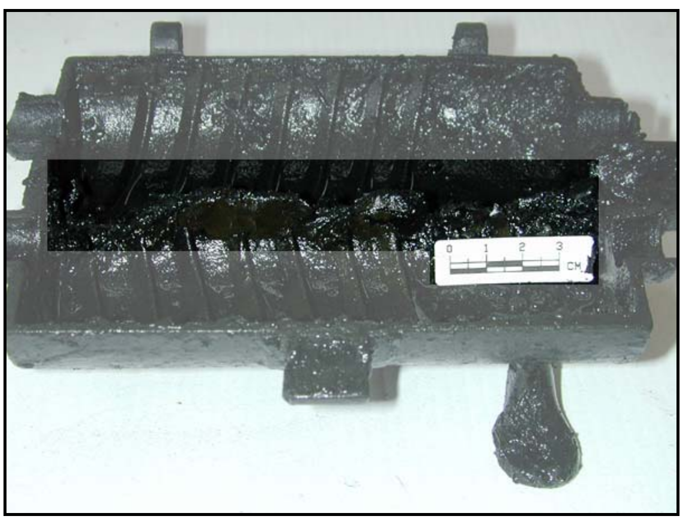


Figure 4.13: Badly degraded knife of one small meat grinder (BJ-17-27). *Photography by A. Borgens.*

The casing has a cast mark that reads: PATENTED\MARCH, 15\1859 (Figure 4.14).

The grinders were conserved using the previously described sodium sulfite method.

Figure 4.14: Meat grinders' case markings. *Photography by A. Borgens.*

Handles

The handles for the grinders were not packed with the grinders. They were placed into the crate where they would take up the least amount of room. Two handles for the smaller grinders (BJ-17-14 and BJ-17-15) were found between the axe handles and the south side of the crate. The curve of the axe handles created the perfect space for them to fit into (Figure 4.15).

The second set of handles (BJ-17-95) was recovered in the center of the crate, on top of the leather belts and sheaths. The wooden handle of the arm was sticking straight up into the crate, ending on the northern side of the shovels.

The handles consist of two parts, a cast iron arm that would attach to the square shaft of one of the rollers and a wooden handle attached perpendicular to one end that was grasped to turn the grinder. The wooden handle was attached the cast iron arm with a wrought iron pin. This pin had a head that was as wide as the diameter of the end of the wooden handle. However, like the rest of the wrought iron in the crate, the pin did not survive.

The cast iron arms were treated with sodium sulfite. The wooden handles went through the acetone rosin treatment.

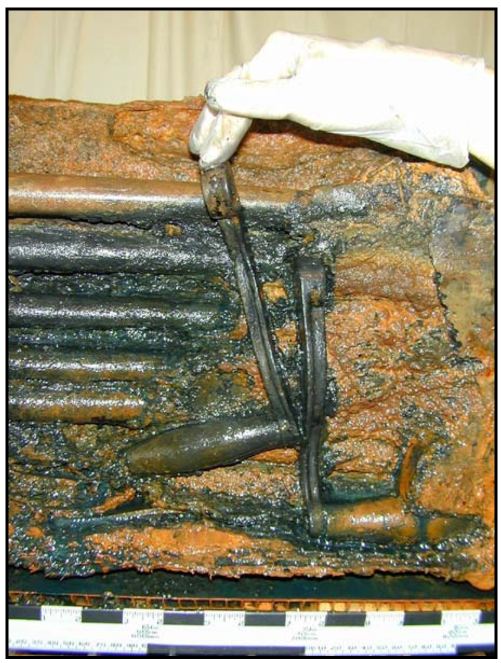


Figure 4.15: Meat grinder handles, BJ-17-14 and BJ-17-15 on south side of crate.
Photography by A. Borgens.

Scythes

Two packages of wrought iron scythes were excavated from the top layer of the *Brother Jonathan* crate, BJ-17-28 and BJ-17-29. Both of these were found just north of the axes; the tangs of BJ-17-28 curved into the southwest corner (See Appendix E). These packages were wrapped in a rough rope with only the tangs sticking out free. Due to the multiple materials contained in these artifacts, the conservation was a multi-step process.

Excavation began with the discovery of the rope wrapped package. The tangs of the scythes presented themselves as voids in the wood shaving matrix of the crate (Figure 4.16). Each void was carefully cleaned out and cast in two part epoxy. Since these were the first casts being made on the project, they were done in regular two-part epoxy requiring four hours to set up before the crate could be lowered back into its holding tank. As the project continued, a marine epoxy (Bio-Seal 192) was used which required only one hour to cure before re-immersion.

Figure 4.16: Voids of scythe tanks from BJ-17-28. *Photography by C. Sowden.*

Each tang of the two packages was carefully cast prior to their excavation. Due to their size and complexity, the scythes were the last artifacts removed from the top layer (originally the bottom) of the crate (Appendix E). Concretion was cleaned from the top and sides of the packages with air scribes and dental tools; the *Brother Jonathan* crate was so tightly packed that it was impossible to get under the scythes without damaging artifacts under them. Wide, thin metal wedges were driven directly underneath each package. Each one was carefully loosened to make sure that the epoxy tangs would stay with each package. The only damage incurred was the removal of part of the top of the paper wrapping of the door lock package (BJ-17-45).

X-rays of the packages showed that there were six scythes in each package. The tips of the scythes were separated into two groups with a small wedge of wood; the tips are very thin and narrow and the wedge helps give that end of the package shape. A small flat rectangle of wood was inserted into the warps of rope in the center of the package. There was evidence of paper left on these rectangles; however, after exposure to air, the paper quickly disintegrated. The wood and paper were most likely a packing label, telling the merchant exactly what was in the package.

Due to the complex nature of these artifacts, the conservation process is involved and was approached carefully. From X-rays, it is known that there were six scythes in each package. This type of tool, due to shape and use would have been manufactured in wrought iron. Since all the other wrought iron in the crate did not survive 135 years immersed in salt water, it was assumed that the scythes had suffered the same fate. The first step in the conservation process was to stabilize the rope of the wrapping. Since the majority of the package was organic, the entire artifact went through the silicone oil process to treat the rope.

The two packages were conserved separately, at different times so the method could be refined as needed. Since the fibers of the rope were so porous, the dehydration baths went in 50% increments: 50% DI water/50% ethanol, 100% ethanol, and 50% ethanol/50% acetone. To help maintain the integrity of the cast tangs, the dehydration process was stopped at this point since the epoxy is soluble in acetone. Silicone oil uses the acetone to penetrate the object, but ethanol will work, just not as effectively; for this reason, the package was left in the silicone oil solution longer to insure full penetration.

When the package was removed from silicone oil, the epoxy cast tangs fell off the package and broke into pieces. This is due to insecure adhesion of the epoxy to the loose iron corrosion products, combined with their immersion in 50% acetone as well as the latent acetone left in the silicone oil solution from previous artifacts. Each piece was carefully cleaned and mending was attempted. The results are less than ideal since the epoxy twisted and buckled, however enough information was obtained that a replica was easily made. The tangs had one very interesting feature, a maker's mark: CHARLES ALLEN\GERMAN STEEL.

The excess silicone oil in the scythe package was allowed to drain for several months over the summer while the author was away on a field project. Once cleaning began, it was a simple process to remove most of the adhering concretion using a small chisel and hammer. The rope was resilient and the removal of concretions did not damage it (Figure 4.17). Several casts were made of concretions that had impressions of pieces of the adjacent animal traps.

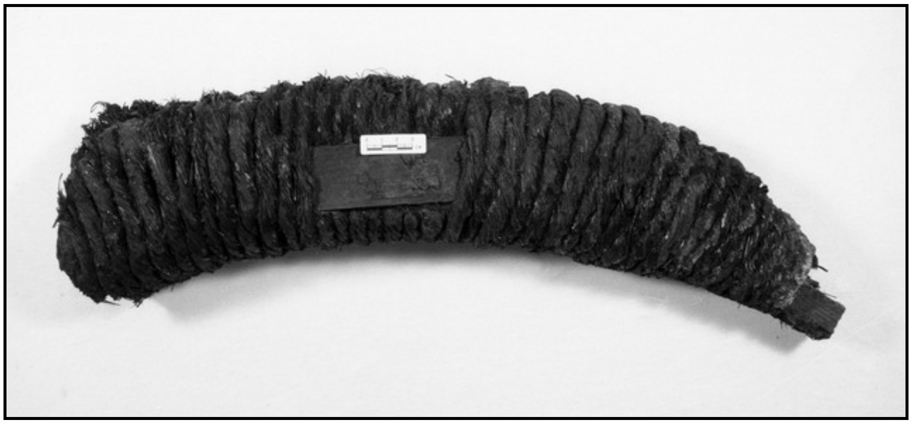


Figure 4.17: Scythe package BJ-17-29 after silicone oil treatment. *Photography by A. Borgens.*

After the exterior was cleaned, the interior was cleaned using a thin stainless steel blade from a windshield wiper. Access was through the butt end of the scythes where the epoxy tangs had been. Through this hole, it was observed that, just like most of the other packages from the crate, each scythe was wrapped in a thin sheet of paper. Since the paper likely gave a good impression of the scythes, two-part epoxy casts were planned for three scythes. Gaps around the wooden wedge at the point end were dammed with plasticene clay and the entire end was covered with plastic wrap to prevent any leaks outside of the package. Two-part epoxy was used with a touch of white pigment to make it visible. It was readily apparent after the first attempt there were leaks and the epoxy was filling more than just the three scythes planned. Several more pours were made until the three cleaned scythes were filled.

After the epoxy hardened, the plastic wrap was removed from the tip to reveal that the epoxy had leaked all around the exterior of the package. This was all carefully cleaned off using an air scribe with good results. Once the exterior was cleaned, the opening process began. Each warp of rope was cut using a scalpel blade on the front and back of the package; the cuts were made at differing heights so when it was put back together, there would be a less noticeable, irregular line down the sides of the package. As each strand was removed, a small drop of superglue was placed on the cut face of the rope to prevent fraying.

Once all the rope was removed, the interior was carefully air scribed to remove as much of the excess epoxy as possible (Figure 4.18). The excavation of this package did not reveal as much information as possible due to the leaking epoxy. The second package was conserved using the silicone oil process, but the scythes were not cast using

Figure 4.18: Interior of the scythe package (BJ-17-29) with wood tip separator.
Photography by C. Sowden.

two-part epoxy. The package was opened and as each scythe was revealed. A flat mold was made of each scythe with RTV, silicone rubber. While this did not a complete replica of any one scythe – top and bottom, it gave much more information than the method used on the first package.

When the first package was opened, a small square of paper that had writing on it sat just under the rope wrapping. Although much of the paper is occluded by iron and sulfite staining, the words “Charles Allen” as well as “German Steel” and “New York” are visible. This is further confirmation of the “Charles Allen” and “German Steel” marks found on the tangs of the scythes. During excavation of the package, evidence of more pieces of paper the same size was found, but they had been destroyed by the epoxy.

Hooks

On the second and third layers of the crate up from the original bottom, eight packages of cast iron wall hooks were recovered, mostly from the western half of the crate (BJ-17-37, BJ-17-42, BJ-17-44, BJ-17-46, BJ-17-59, BJ-17-64, BJ-17-66, and BJ-17-72) (See Appendix E). The majority of these packages came from the west edge. The excavation technique used to remove each package was similar to the sheaves. Usually, at least four sides were showing before removing a package. Small thin tools were used to clean between adjoining packages and eventually the package would free from adhering concretion and lift out. One package was so tightly packed, that it was impossible to clean all around them; it was unpacked in situ (BJ-17-66). In all, there were eight packages with 72 hooks in each package.

The complete packages that were removed were fairly beaten up; the size and shape of the hooks did not lend themselves readily to package stability. It was decided after experimenting with the sheave packages that it would be best to carefully cut each package open and remove the contents, and then conserve the paper and the hooks separately.

Like the sheaves, they were carefully wrapped with string, two wraps along the width and one perpendicular wrap around the length. Most of the packages had remnants of a small square of extra paper under the string on the small end, usually facing the west side (Figure 4.19). While no printing is visible, it is believed that these were labels or packing slips similar to the one found inside the scythe package. After treatment, some printing was visible on several pieces of paper including the name of the company: RUSSELL & ERWIN (Figure 4.20).

Figure 4.19: Label on end of hook package (BJ-17-66). *Photography by C. Sowden.*

Figure 4.20: Remnant of a label from a hook package after conservation. *Photography by J. Swanson.*

Within each package there were four small packages of 18 hooks, each wrapped in thin paper. The 18 hooks were arranged three across, two tall, and three deep, with the feet at the top and bottom of the package and the heads in the center, overlapping to take up the least amount of space.

Due to the lack of sustainable iron left in all of the cast iron in the crate, each artifact was treated using the sodium sulfite method. This was done with all 576 hooks recovered from the eight packages.

The hooks were pieced back together after being waxed using superglue (Figure 4.21). During this process, it was noticed the hooks were not exactly the same. Differences were noted and all of the hooks were easily divisible into two different casting molds. “A” has a wider, flat foot while “B” is skinnier and rounded and the seam goes up the side (Figure 4.22). Five hundred and seventy-five of the 576 hooks fit into one of these two molds. One hook from package BJ-17-46 is noticeably larger; a different item all together (Figure 4.23). The braced wardrobe hooks were sold in six different sizes (Russell and Erwin Manufacturing Company 1865:87). Most likely, they were stored in bins similar to those that nails are today and one was placed in the wrong bin. As the person was packing these packages, he did not notice the oversized hook as he grabbed a handful to wrap up.

Figure 4.21: Author piecing together some of the 576 wardrobe hooks with super glue. *Photography by J. Swanson.*

Figure 4.22: One example of each mold of the cast iron hooks. On the right is mold A and on the left is mold B. *Photography by J. Swanson.*

Figure 4.23: Large hook and regular sized hook from package BJ-17-46. *Photography by J. Swanson.*

Rails

The cast iron rails associated with the door and window sheaves were found on the north side of the crate under the meat grinders (BJ-17-41) (See Appendix E). There was a large amount of packing material, including pine needles and wood shavings, between the two groups of artifacts; this would have protected both items from jostling. Also, between the two layers and under the first small grinder (BJ-17-26) was a large wading of fibers (BJ-17-7). These fibers have not been identified.

The rails are cast iron, two feet long, and were wrapped in pairs in a sheet of thin paper. Each rail has three parts: two flat flanges on the exterior edges enclosing a semicircular raised center. The two ends of the rails are different. At one end, the semicircular center protrudes from the flat sides by one-quarter inch. The other end finds the semicircular center recessed into the flat sides. This would allow two rails to be laid together and they would interlock. Each rail has six holes, three on each side.

There are two holes at each end, one on each side. The final two holes do not match up, each is 1/3 the distance from the end.

The rails were conserved using the sodium sulfite method in specially made PVC pipe containers with screw cap lids that were sealed using Teflon tape. Broken rails were waxed in the traditional method after tannic acid application. Those that were still whole by the end of the treatment were too long for the wax vat. These were coated with polyurethane mixed with graphite after application of tannic acid (Hamilton 1996:86). These gave some interesting results; the long rails, after drying, curled (Figure 4.24). Since the thin rails were completely graphitized cast iron, they had minimum iron content and were prone to breaking and even bowing. They were laid on a flat table to dry in a controlled environment, so the curling results from the unique nature of cast iron.

Figure 4.24: Curved door rails (BJ-17-41) that had been coated in polyurethane and graphite. *Photography by C. Sowden.*

Traps

The east half of the crate, below the top layer, contained many unidentifiable voids where iron object were once present (See Appendix E). A two-part water-curable epoxy was used to fill the voids. After much casting, further cleaning, and research, it was discovered that these pieces belong to a number of small wrought iron animal traps called long spring traps. Two different sizes were present.

The traps proved to be the most difficult artifacts to excavate and conserve. Thirty wrought iron traps in two sizes were identified. Six small traps were listed in the 1865 Russell and Erwin Manufacturing Company catalogue as a #1 trap for muskrats and 24 larger traps that are listed as #2 for fox and otter (Figure 4.25) (1865:411). Each trap is comprised of several pieces: a set of jaws (BJ-17-56), base (BJ-17-18), crosspiece which attaches to and holds the pan in place (BJ-17-18), a pan and dog (BJ-17-51), two springs (BJ-17-57), a length of chain, and several rings to hold the chained traps in a group. Each large trap has two springs, one on each end of the jaws. The small traps have only one, smaller spring. The flat bases of the traps are tied together, possibly in bundles, with string. The base pieces contained no intact metal, while the springs did. Because the springs needed to be flexible, they were forged using a more noble or higher quality iron than that used for the base piece. There do not appear to be any teeth in the jaws, which is typical of small animal traps and suggests that they were for fur hunting.

There is a large quantity of chain in the crate (BJ-17-38). This is associated with the traps and would be used to stake or attach the traps when set. At least six large rings have been found associated with the chain (BJ-17-36, BJ-17-50, BJ-17-55, BJ-17-86, BJ-17-89, and BJ-17-94); this would have been the center point of the trap set. Most contemporary drawings show traps in sets with a turnbuckle to keep them upright in any situation; however, these turnbuckles have not been found. In the crook of several springs a link of chain was found that encircled the bend.

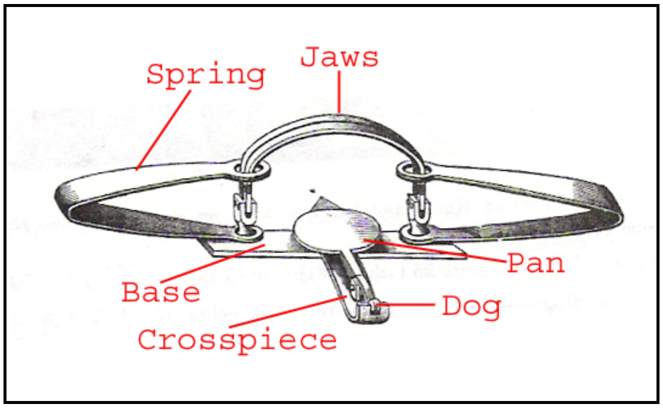


Figure 4.25: Trap illustration with parts labeled by the author (Russell and Erwin Manufacturing Company 1865:411)

More than enough information was recovered from the epoxy casts to discover their original size and reconstruct a trap. The exact amount of chain that was packed in the crate is yet unknown and may not be able to be determined. There is no indication that there were different chain link sizes for the two sizes of traps.

A single trap pan had the maker's mark. S. NEWHOUSE ONEIDA COMMUNITY NY: was stamped around the outer edge of the pan. All contemporary drawings show their traps with makers' marks on either the spring or the pan.

For all intents and purposes all the iron was corroded leaving only a void where the trap once was. No iron remained to be conserved.

Hatchets

Two packages of hatchets were recovered from the west side of the crate on the second and third layers (BJ-17-33 and BJ-17-62) (See Appendix E). The heads were wrapped in paper and were located in the northwest corner. The handles protruded from the corner along the west side. Each package contained six hatchets. The area just east of the heads was filled with packing material to separate the hatchets and the sliding door rails. This was added in the small space that would have been there so the rails would not shift during transit.

Figure 4.26: Author removing a hatchet (BJ-17-62). *Photography by A. Borgens.*

All of the hatchets had to be removed one by one (Figure 4.26). There was an attempt to remove the second package (BJ-17-62) as a unit, but due to surrounding packages, it was impossible to get enough space to free the east side of the package. As each handle was removed, the paper for the corresponding head was carefully cut away. Since the heads were wrought iron, there was nothing left inside the paper except an impression. Each head was cast using RTV silicone. From these castings a complete replica head was made by make a mold of the cast and then casting the mold in epoxy.

There are several noticeable features of the hatchet head. As was commonly done, the bit of the blade was made of steel and its striations run perpendicular to the striations of the rest of the head. One of these bits remained and was conserved using electrolytic reduction (BJ-17-33). The second and more exciting feature is that the heads were stamped with a maker's mark near the blade (Figure 4.27). This mark said: No. 2\RUSSELL & ERWIN\MAN'FG Co.\WARRANTED. This feature was not discovered until the last head had been cast. This mark led to the identification of the Russell and Erwin Manufacturing Company being the manufacturer of the hatchets and supplier for the entire contents of the crate. Without this discovery, the identity of the wholesaler would have remained a mystery, just as the purchaser has.

The wood handles were dehydrated and conserved with acetone-rosin as described for the axe handles. The wood of the handles was not identified.

Figure 4.27: Hatchet maker's mark discovered as an impression in paper wrapping. *Photography by A. Borgens.*

Door Locks

One package of door locks was uncovered on the second level under the scythe packages (BJ-17-45). The door lock package was the only piece that was disturbed by the wedges used to remove the scythes. The contents of the package were unidentifiable until it was removed. The first two pieces that were removed from the package were an unusual brass key and another brass piece that was later identified as a spring. Once the catalog was found, the lock was identified due to the unusual shape of the key.

Due to the damaged nature of the package, removal from the crate was not easy and the package came apart into three pieces consisting of three individually wrapped packages. One of the smaller packages was x-rayed and it showed that there were two locks in each package, one for right-handed doors and one for left-handed doors (Figure 4.28). Each smaller package also contained four keys (two for each lock), two tiny packages of screws, and two bolt receptors.

The locks are a composite construction of cast iron and brass. Some of the interior pieces did not survive excavation and casts were made of as much as could be exposed. The brass pieces included the keys, the long spring, two coil springs, and a bit that connected several pieces on the inside. A full description of the interior of the lock can be found in its patent (#20,850) (Appendix B). The brass was conserved using electrolytic reduction while the cast iron was treated with sodium sulfite.

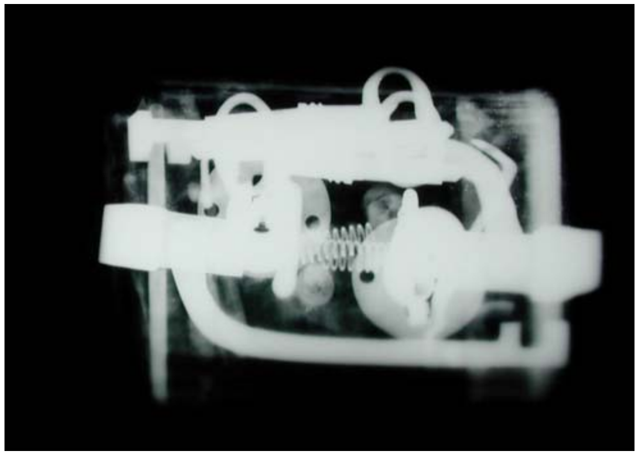


Figure 4.28: BJ-17-45, door locks, X-ray. *Photography by C. Sowden and A. Borgens.*

Keys

One of the easiest packages to disassemble contained brass keys (BJ-17-70). The top of this package had been accidentally sheared off during the excavation of another package. After its removal from the crate, the keys easily lifted right out of the package. Thirty-six brass keys were removed and conserved using electrolytic reduction. Each key is the same shape and has a very rudimentary design with no cut teeth (Figure 4.29).

The problem with identifying this key is that the description of it in the Russell and Erwin Manufacturing Company's 1865 catalog does not include a classification. This key shape was used to illustrate an alternative top (Metropolitan) that could be added to any key but the shape was never identified (Russell and Erwin Manufacturing Company 1865:55). Earlier and later catalogs identify this key, but with varying lock codes, so it is hard to place which locks these keys might work with that are illustrated in the 1865 catalog. However it is probable that this is a stock key that could be used with a number of different door locks.

Figure 4.29: Example of brass keys from BJ-17-70. *Photography by C. Sowden.*

If hardware store could shape keys at this time, this would be the equivalent to a blank key or what is commonly referred to as a skeleton key. There are no teeth and it can easily be shaped to match many of the illustrated keys.

The electrolytic reduction conservation followed the same process as the previously described for the plumb bobs.

Medium and Small Sheaves

Four packages that were similar in size and shape were removed from the third and fourth layers of the crate. One was x-rayed and found to be a smaller cast iron version of the door sheaves (BJ-17-65). By looking through the torn corners of the other three packages, it seemed that they contained the same size of sheaves as well. It was not until the packages were excavated that a mistaken identity was discovered. Three of the packages (BJ-17-65, BJ-17-73, and BJ-17-85) contained four sheaves each of a medium size. The forth package contained eight much smaller sheaves (BJ-17-82). The catalog lists both sizes as being used for sliding shutters or sashes.

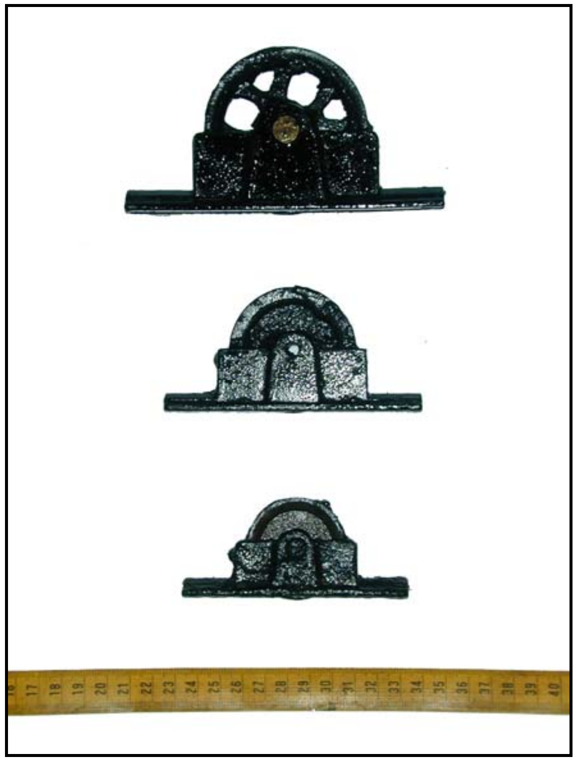


Figure 4.30: Pre-conservation examples of BJ-17-20, BJ-17-65, and BJ-17-82.
Photography by C. Sowden.

The two smaller sizes of sheaves have two distinct differences than the larger ones recovered used for doors (Figure 4.30). The door sheaves use a brass rotation pin for the wheel, while the small and medium sheaves must have used a pin made of wrought iron. There is a hole where the pin would have been, indicating, most likely, a wrought iron piece. The second big difference is the wheel. The large door sheaves' wheels have spokes and open areas, similar to a bicycle's wheel. The small and medium sized sheaves' wheels are solid with no spokes or open spaces. Inside the rim of the wheel is tapered on both sides and remains that way until just before the pin when it widens again to the full width of the rim to form the pin socket.

These packages were removed from the crate in the same manner as the hooks and large sheaves; they were carefully cleaned as far around as possible and then a stainless steel plate was used to help lift the package up. They were unpacked in the same manner as well. It is likely that the sheaves inside were wrapped in a thin paper like the door sheaves; however, this paper had turned to mush and it was difficult to differentiate between the outer and the inner paper.

The sheaves were treated with sodium sulfite.

Door Knobs

The third layer down on the west side contained three packages of ceramic doorknobs (BJ-17-74, BJ-17-75, and BJ-17-92) (See Appendix E). Two of these were one layer east of the western edge; BJ-17-92 was located under the tap borer packages. Removal of these packages was difficult due to their positioning, their contents, and their weight. Two of the three packages were packed next to non-square items. One was against a tap borer package and sitting in a coil of leather belts; the other was wedged against some of the sheath belts. Both of these packages had to be opened and unpacked in situ (BJ-17-75 and BJ-17-92). The third package was carefully removed and recorded intact. The shape of the knobs gives the packages a rounded contour, making excavation difficult; the weight of the ceramic causes extreme stress on the fragile paper.

These artifacts are of a complex nature; the handle is ceramic while the mechanics of it are both cast and wrought iron. The wrought iron spindle of each knob disintegrated in the crate and it was impossible to even make a mold of it as were some screws and other features (Figure 4.31). These doorknobs are unusual in that they are single knobs with a spindle. Most often, doorknobs are sold in pairs that fit together through a door and lock.

Figure 4.31: Doorknob with remnants of spindle and screw head. *Photography by C. Sowden.*

It would have been impossible to separate the ceramic portion of the knob from the iron so they were treated as a unit. Each knob went through a thorough desalination process. The ceramic was treated first using a thin PVA solution in acetone as a consolidant (Hamilton 1996:15). The solution was placed in a measured container that the knobs fit in so the iron portions were not in contact with the PVA. The knobs were immersed for 24 hours and then removed and allowed to dry for several hours. This process was repeated. The third and final PVA bath was much thicker to give the ceramic a thick coat to protect it while the iron was treated. Once completed, the knobs went into sodium sulfite treatment with the remaining door knob hardware. The knobs were retreated with the thick layer of PVA between each sodium sulfite bath. Once the process was completed and the knobs were rinsed, a guard was made to protect the ceramic while tannic acid was applied to the iron. The excess PVA was removed with acetone and the entire artifact was encased in microcrystalline wax (Figure 4.32).

It is not possible to recreate the stem of the knobs since there was no material inside the paper package to leave a void in which to create a cast. Upon opening the package, the stems were either already gone or fell apart before any information could be gathered. Since there was no iron left in the stems, they did not appear on the x-ray taken of the one intact package. However, the cross section dimension can be determined from the measurement at the base of the knob, where the stem would have been attached. Stem length depended on the door; they could be cut to fit the thickness of the door. The original Russell and Erwin Manufacturing Company catalog did state that all drawings were at size unless stated; if time permitted, someone could go back to the New Britain Public Library and measure the original catalog drawing.

Figure 4.32: Completed doorknobs, BJ-17-92. *Photography by J. Swanson.*

Window Locks

Two packages of window locks were recovered from the bottom layer (originally the top layer) of the crate, one in the southeast corner (BJ-17-68), the other next to the doorknobs (BJ-17-69). This group of artifacts is the only one in the crate that was not packed in equal numbers; all other multiple packages contain the same number of artifacts in each package. The window locks are in a package of 12 (BJ-17-69) and a package of five (BJ-17-68). They are also unusual because the package of five is the only package in the crate that is not packed in a multiple of three or four.

These packages were removed in the same manner as the hook packages. They were cleaned all the way around and carefully lifted out.

X-rays revealed that the locks were a combination of brass plates and cast iron body and latch (Figure 4.33). After the two packages were documented, they were carefully unpacked by cutting off the exterior packaging. Each lock was wrapped in the usual thinner paper; this was also carefully cut off.

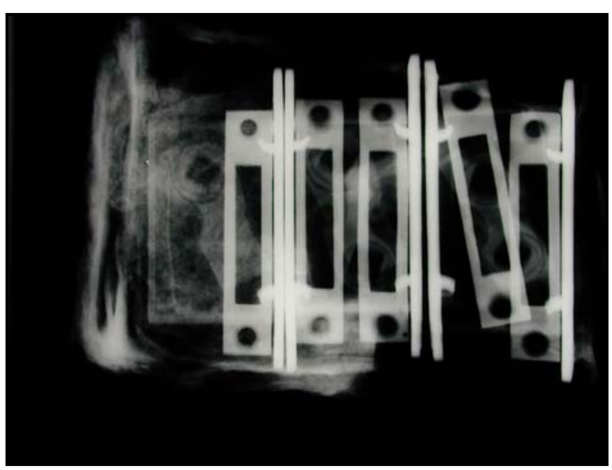


Figure 4.33: X-ray of BJ-17-68 with five French window locks. *Photography by C. Sowden and A. Borgens.*

The main body of the lock was made of cast iron while the faceplate and door guard were both brass. The door guard was a separate piece and was conserved with electrolytic reduction. The locks appeared to be whole, but a thin separation line could be seen at the top of the case. Carefully using a scalpel and dental tools, this area was cleaned out and the lid of the lock could be easily removed. The interior of this lock was much simpler than the door lock. Many of the interior pieces had disintegrated; this included a screw to hold the top plate to the body as well as a spring which held the bolt in place. An RTV mold of the spring was made.

Several of the brass faceplates were removed, but the majority was not. The face plates were attached to the locks in such a manner that removing them caused the locks to break. The plates had small hooks, visible in the x-ray in figure 4.33, which held tight to the body of the lock. Those that were removed were treated with electrolytic reduction. The locks were conserved using the sodium sulfite method. The brass faceplates still attached to the locks were polished prior to the application of tannic acid similar to the method used to polish the brass rotation pins in the large door sheaves.

Tap Borers

Three packages of tap borers were recovered from the center of the crate; there were three borers in each package. Due to fact that the handles were not incased in the paper package and had to be individually removed, each handle was excavated separately and given an unique artifact number (Handles – BJ-17-43, BJ-17-60, BJ-17-61, BJ-17-63, BJ-17-71, BJ-17-77, BJ-17-78, BJ-17-79, and BJ-17-80; Tool packages – BJ-17-76, BJ-17-90, and BJ-17-91). The auger bits were wrapped in paper and the handles extruded from the paper. The augers were laid out along the north south axis with the handles being toward the north side. The handles were under the south edge of the door rails (See Appendix E).

The handles were carefully and easily removed by cleaning the concretion around each one and carefully lifting it free. Most of the handles had one or two brass washers directly opposite from where the tool entered to help hold the tool on.

Like the rest of the wrought iron tools, the auger bits did not survive and occur only as molds in their paper packages (Figure 4.34a). X-rays of the package show a smooth scoop shaped tool with a screw tip (Figure 4.34b). The tool is identified as a tap borer in the Russell and Erwin Manufacturing Companies 1865 catalog. However, this illustration shows a different handle type (Figure 4.35a, b and c). A handle similar to the ones recovered can be seen on page 216, sold separately from any tool (1865:196, 216).

Figure 4.34a: BJ-17-76, tap borer package.
Photography by A. Borgens.

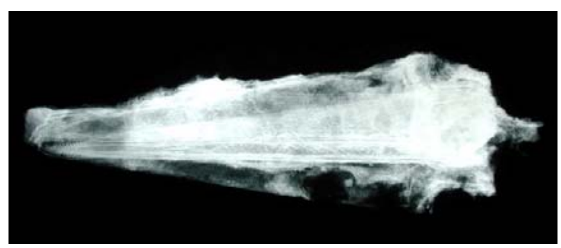


Figure 4.34b: X-ray of BJ-17-76.
Photography by C. Sowden and A. Borgens.

Close inspection of the drawing of the tap borer shows a bend in the tongue before it attaches to the handle. One small piece of iron was recovered from BJ-17-60 that has a similar bend. Several small casts were made of the top of the packages and a bend in the tongue of the tool was seen. This further validates the identity of the tools as being tap borers.

The packages were conserved using silicone oil. It is unsure if a full replica of the tool can be manufactured due to the fragile nature of the paper and the likeliness of leaks similar to the scythe packages. The majority of information of the tools will have to come from the X-rays made of each package.

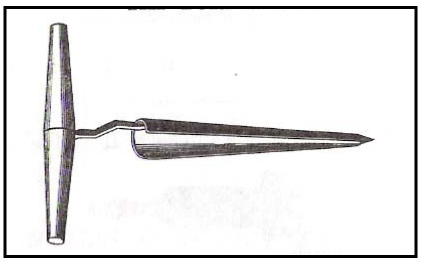


Figure 4.35a: Tap borer illustration (Russell and Erwin Manufacturing Company 1865:196)

Figure 4.35b: Tap borer handle recovered from the crate. *Photography by J. Swanson.*

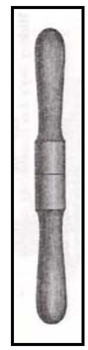


Figure 4.35c: Tap borer handle illustration (Russell and Erwin Manufacturing Company 1865:216).

Based on the sizes of the handles in the crate there are three different sizes of tap borers. Two packages contained a total of six augers all of the same size; this tap borer would create a hole one and one-half inches in (Package: BJ-17-76 with handles: BJ-17-61, BJ-17-63, and BJ-17-77 and package: BJ-17-91 with handles: BJ-17-78, BJ-17-79, and BJ-17-80). The third package contained two large handled borers and one medium handled borer; it is impossible to distinguish three distinct borers in the X-ray of the artifact (Package: BJ-17-90 with handles: BJ-17-43, BJ-17-60, and BJ-17-71). It is possible to measure the maximum width of one tool; it would create a hole one and three-quarters inches in diameter. Since the borers are sold in size increments of one-quarter inch, it seems reasonable to assume that the largest borers would create holes two inches in diameter. This third package is unusual since there is only one example of each size; this is the only group where there is only one example in the entire crate.

The handles were conserved with acetone-rosin. The auger bit packages were conserved with silicone oil.

Coal Shovels

Two sets of wrought iron coal scoops were recovered from the bottom layer of the crate (BJ-17-67 and BJ-17-93). One set was sitting on top of the sheaths' belts while the other set was sitting directly on the excavated bottom (lid) of the crate. There were six shovels in each set. They consisted of a wooden handle and a wrought iron shovel. The two sets were oriented differently; both were laid out along the east-west axis (See Appendix E). However, the shovels of BJ-17-67 were facing up with the handles toward the east, while the shovels of BJ-17-93 were facing down and the handle toward the west.

Excavation was a combination of carefully removing the wooden handles and casting the surface of the shovel in RTV. Some of the initial casts were attempted using household silicone door sealant to try and save some money, but it did not give sufficient results. The remaining scoops were cast with RTV. The shovel was not attached directly to the handle; the tongue that inserted into the handle was welded onto the shovel at three points. These attachment points were cast in RTV as well as two-part water-curable epoxy. After each cast was made, the surface of the shovel was carefully cleaned away using an air scribe and the next one was carefully cleaned and cast. The casts, due to the nature of the RTV, were slightly malleable and did not hold their shape very well. The last shovel was cast using RTV reinforced with mesh screen. This gave an excellent result; the cast had a free standing shovel shape.

There was one big difference between the two groups of shovels. The second group, BJ-17-93 had a brass cuff at the base of the handle where the shovel attached. The handles from the first group are cut down in the same manner, but the cuff is not there.

The shovels were tied together with string at both ends of the handle (Figure 4.36). The handles were conserved using the acetone-rosin method while the brass cuffs were conserved using electrolytic reduction.

Figure 4-36: Coal shovel handle, BJ-17-67. Note string tied around upper part of handle. *Photography by J. Swanson.*

Sheaths

At the very bottom of the crate was an array of leather. There were 36 leather knife sheaths with their accompanying belts randomly placed in the crate (BJ-17-48).

Due to the nature of the leather, they were not as neatly packed as the paper wrapped packages. They were placed to fill gaps in the packing.

Due to the excellent preservation of the leather, their removal was simple. Using dental tools to clean each sheath, they could then be individually popped free. The attached belts easily pulled apart with a little help from flat dental tools. The sheaths have two small parallel cuts near the top; the belt is woven through these two cuts.

Each belt had a small buckle made of iron that did not survive the 130 years underwater. One mold that was in especially good shape had a pink-blue hue. The molds of the front of the buckle had a larger diameter than the rest of the buckle. It seems likely that there was a copper tube on the crossbar of the buckle that the tongue would have sat on.

The sheaths and belts are obviously hand cut because they vary in size; the sheaths range from 19.0 – 20.9 cm in length and the belts fluctuate from 85.7 – 103.6 cm in length. These sheaths confirm that the merchandise in the crate is new; many of the punched holes in the belt still had the small plugs that would have been removed after use.

After they were excavated the string originally used to sew the sheaths together began to degrade and the seam split. These were mended using a fine fishing line and a needle (Figure 4.37). It was a simple process to repair the sheaths sewing through the holes that had been created during the original manufacturing process.

All were conserved using silicone oil.

Figure 4.37: Author sewing knife sheaths (BJ-17-48) together at seam with fishing line. *Photography by J. Swanson.*

Figure 4.38: Belt, BJ-17-83. *Photography by J. Swanson.*

Belts

The last items removed from the crate were six large work belts (BJ-17-83). The work belts were folded in half and laid along the east-west axis. The folded side was found along the east face. These were carefully removed from the crate as the sheaths were. Once an end was loose, the rest of the belt peeled up. This is the only artifact that does not have an illustration in the Russell & Erwin Manufacturing Company 1865 catalog. However, there is no reason to suspect that it is not from the catalog. The section where the sheaths are sold, belts are sold separately, but not illustrated.

The buckle of these belts did not survive. A few casts were made of the natural molds and a likely replica was produced in two-part epoxy.

The belts are plain leather except for a single embossed line along the top and bottom which was probably made by the cutting tool run along each edge (Figure 4.38). They were conserved using the silicone oil process.

The upside down crate

It was hypothesized upon first evaluation of the crate and beginning excavation that the *Brother Jonathan* crate may have been delivered to the Conservation Research Laboratory upside down. There was no way of predetermining what was the top and what was the bottom of the crate. The crate was simply left in the received position. The meat mincers were discovered on the top layer upside down. The traps were all in an upside down position with the jaws of the traps closer the bottom of the crate. Items that have less weight, such as the leather sheaths and belts were found on the bottom of the crate. It is logical to pack boxes and crates with the large and heavy items on the bottom for better stability. If, in fact, the crate is upside down, the bottom would have been packed with the two largest items, the axes and scythes, as well as the heaviest, the meat mincers and plumb bobs.

When the excavation was over, the neatness of the crate also shows that it was excavated upside down. The top layer was very organized, all the packages were square and fit together well. As the crate was excavated, it was noted that the organization broke down. The bottom of the crate held the leather and shovels which were stacked in no apparent order, perhaps fitting them into the crate wherever there was space so the top would fit flush. In all, it is a certain conclusion that the *Brother Jonathan* crate was unpacked or excavated upside down from the direction in which it was packed. Appendix E and F give a graphical view of the crate as it was disassembled and illustrate this argument.

CHAPTER V

ARCHITECTURAL HARDWARE

The largest group of artifacts contained in the *Brother Jonathan* crate is of an architectural nature. Most of them are finishing hardware pieces for a house. The architectural elements under discussion are: interior working hardware for sliding or pocket doors, interior working hardware for sliding, rolling, or sash shutters, locks for doors, locks for French windows, keys, doorknobs, and wardrobe hooks.

A brief introduction to the Victorian era and its architecture is necessary before any discussion and analysis of the artifacts. The English first introduced the Victorian style in 1837, the year Queen Victoria began her reign (Wyatt 1996:232). In America, the period dates from 1840 to 1910. Within this block of time, there are several distinct styles, including the Queen Anne and the Colonial Revival (Jayne 1996:272). These sub-styles are, however, not important to this discourse. Victorian architecture endured numerous criticisms, most notably that it was unbalanced and disordered. However, the style persevered, and today these houses are some of the most desirable on the housing market.

Pocket Doors

The *Brother Jonathan* crate contained two sets of artifacts that work together to operate pocket doors. The first set is 50 long cast iron rails found packed in the crate in pairs (BJ-17-41). Each rail is two feet long and, in cross section, has two flat tangs with a raised, semi-circular center. The tangs have three holes for attachment on each side: on one side, there is a hole at both ends and one approximately 1/3 down the length, while the other side has its third hole approximately 2/3 down the length (Figure 5.1). Over the length of the rails, the semi-circular center is offset from the tangs by one-quarter inch; at one end, it is inset from the tangs, while at the other end it protrudes. The result is that these rails will fit together to form a longer rail, which is needed to cover twice the width of a sliding door.

Figure 5.1: Door Rails, BJ-17-41. *Photography by J. Swanson.*

The second set of artifacts recovered was large pulley-like objects (BJ-17-20, BJ-17-21, BJ-17-22, BJ-17-30, BJ-17-31, and BJ-17-32). Knowing that they belong to sliding doors, the more correct term for these items is sheaves. The wheel is three inches in diameter. The casing and wheel are cast iron, while the rotation pin for the wheel is brass. The iron housing for the wheel is, 5½" long, 1" wide, and 1½" high. The housing consists of a case around the wheel and two length extensions at the bottom. The bottom of the housing, in cross section, has a form that fits perfectly over the previously described rails. The flywheel of the sheave has a groove that is the exact size to roll over the runner on the rails or tracks. There are two holes in the housing at the ends of the extensions (Figure 5.2).

The majority of sliding doors in historical settings were hung from the top of the doorjamb (Cole 1999). Today, all sliding doors are hung from the top. However, the

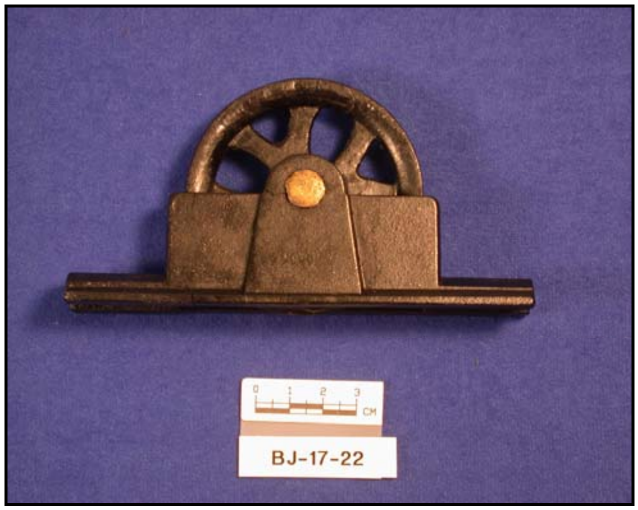


Figure 5.2: Door sheave (BJ-17-22). *Photography by A. Borgens.*

hardware found in the *Brother Jonathan* crate indicates sliding doors were also mounted on the floor. The sheave would have been inset into the door with the base of the housing attached to the bottom of the door, using the holes to screw the whole sheave into the door. There would have been two sheaves per door, one at each edge. For each door, the length of railing needed was twice the door width, one-half in the pocket and one-half in the doorway extending to the furthest point that the door slid; this is the case for both top hung and bottom set doors. The railing would have run along the floor; however, to keep it out of the way and not impede walkways, it is quite possible that the rail would have been inset entirely into the floor or with only the small semi-circular center protruding into the walk space (Pat Hiler 2002, pers. comm.). The door, with the sheave inset in it, would roll along the rail on the floor in and out of a wall pocket.

This is an unusual arrangement for a sliding or pocket door. There is mention of doors running on the floor on several websites; however, only top hung doors are ever discussed in length as to their set up and mechanism. The only historical evidence found using the proposed set up comes from a set of ship plans from 1912. The *SeeandBee* was a steamer built for passenger travel on the Great Lakes in 1913. Within the set of drawings is a small technical drawing of a sheave for a “state room sliding door” that show the exact proposed set up (Figure 5.3).

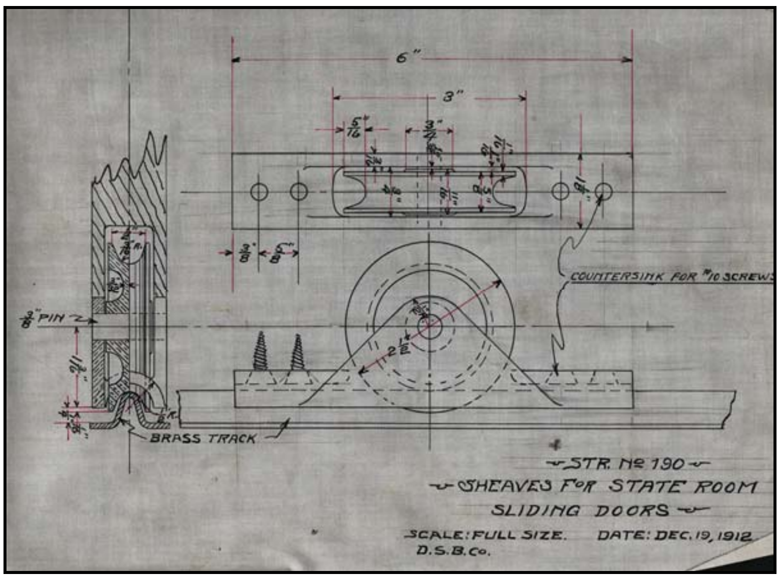


Figure 5.3: Illustration of a sliding door set on the floor. This drawing is from the 1912 Great Lakes steamer *SeeandBee* (Great Lakes Historical Society 1912).

Many large Victorian homes used pocket doors extensively in their entertaining areas. They were usually placed on the first floor in the common rooms. Very often, they are found between two parlors, or between a parlor and a dining room (Jayne 1996:276). Figure 5.4, a house plan from before 1873, shows four pocket doors in its design: one on each side of the entrance way to the two parlors, one between a parlor and a dining room, and one between the other parlor and a chamber (Cummings 1873:plate 16).

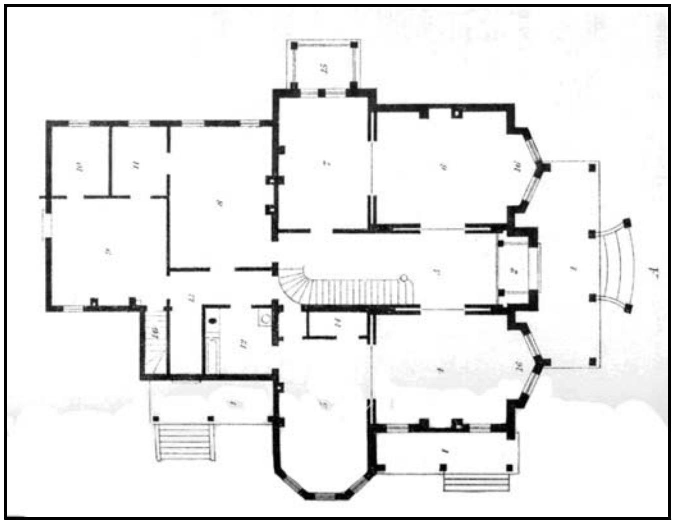


Figure 5.4: A pre-1873 house plan with four sets of pocket doors (Cummings 1873:plate 16).

These rooms, by themselves, were small and fit for intimate or family gatherings. However, if the family wished to have a large party, the doors would have been opened to create one large space.

Another utilitarian benefit of pocket doors is that, because they slide into the wall, they save space where a normal door would swing. The Victorian era was known for its clutter; many rooms were overflowing with furniture, pictures, and knick-knacks (Seale 1981). By using doors that slid into a wall, the space that would have been left clear for a door to open could now be used to place more objects.

The pocket door is a feature that is usually found in the more expensive homes of this period. The installation of pocket doors would cost much more than regular doors. First, it involved building two walls for each door; in the case of figure 5.4, 16 walls were built, where normally only eight would have been. Second, the installation of the hardware was difficult and the maintenance on pocket doors was complex. When houses settle, doors shift in their frames, and sliding doors can inflict damage by scraping a floor or even become stuck in their pockets. It is easy to remove a swinging door and re-hang it. To remove and re-hang sliding doors takes more work and is not done without some forethought. Even today, residents in old houses often will leave stubborn sliding doors in the stuck position. The Edge House on Ennis Street in Bryan, Texas, owned by Edward and Patricia Hiler, was leveled in the mid-1990s and several of the sliding doors in the house have since refused to open. Another remains open because it scratches the floor when it is closed (Pat Hiler, 2002, personal com).

The crate contains 25 pairs of rails; there are 24 sheaves, six packages with four sheaves in each. The rails are two feet long. If a door were two feet wide, it would need four feet of railing, two feet inside the pocket and two feet outside the pocket. While a two-foot door is narrow, pocket doors, when used in the manner described, are usually found in pairs. This, therefore, indicates a four-foot doorway, a much more likely dimension. Each set of doors would use four lengths (or two pairs) of rails and four sheaves, two each for 12 doors in six doorways. The hardware included in the crate can supply six pairs of doors. There are 13 pairs of rails left over if each door is two feet wide; this remainder will be discussed in the next section. If each door was three feet wide, another 12 pairs of rails would be required, leaving a single spare pair.

Sliding Shutter Sheave

The third and fourth items of interest from the *Brother Jonathan* crate are packages containing two different sizes of sheaves. However, these sheaves are used for "sliding shutters, or sashes" (Russell and Erwin Manufacturing Company 1865:62). The sheaves are 2 ¼ inches and 1 ¾ inches in diameter. There is another difference, besides the size of the wheel: the shutter sheave is solid iron, while the door sheave is more like a bicycle, with spokes in the wheel. In addition, the shutter sheaves have an iron pin, as opposed to the brass pin in the door sheaves. With the degradation underwater, this iron pin has completely disintegrated during the last 130 years. Figure 5.5 shows the difference between the three different sizes.

The term sliding shutter has several different possible meanings. The Dictionary of Building Preservation defines an overhead door, which is then referenced to a rolling shutter and a sliding shutter, as a door that would slide up, and sometimes, roll into a cylinder (Bucher 1996:318). This type of shutter was developed in the second half of the 19th century (Bucher 1996:318). The second definition is similar to pocket doors; the sliding shutter slides out from the wall to cover the windows and protect inhabitants from the elements. The Sargent House in Gloucester, Massachusetts, built in 1782, has sliding shutters. Martha Oaks, the curator, describes them as "raised wood panels" that "slide in and out of the walls, very much like pocket doors" (2002, elec. comm.). Both types of shutters are placed inside the window, on the interior of the house.

Figure 5.5: Door sheave with shutter and sash sheaves. *Photography by C. Sowden.*

The sheaves under discussion, in light of the extra rails, are most likely for use as the second type of shutter. There were three packages of the medium sized sheave, with four in each package (BJ-17-65, BJ-17-73, and BJ-17-85) and one package with eight small sheaves (BJ-17-82). There remain thirteen sets of rails; while, like the pocket doors, the mechanism of the sliding shutter is unknown, it is most likely that it is similar to, if not the same as, that previously described for the sliding doors. The shape of the housing for the sheave is the same as the door sheaves, including the raised bottom, to fit over the semi-circular center runner of the rails. Likewise each of the smaller sheaves has a groove in them that rolls along the enclosed floor rails.

If these are used in the same ratios as the doors, two sheaves per shutter and two rails per shutter, then after all the sheaves have been used, there are still three pairs of rails remaining. There are several possibilities: they could be extras ordered by the store owner, they could be for sheaves not yet discovered in the crate or in another crate, or the ratios for the hardware used could be wrong.

Sliding shutters, like the pocket doors, would only have been used in larger, more expensive homes. They involve a more complicated construction and are more difficult to repair. Moreover, these shutters are used primarily to shield expensive furniture from the sun.

Sliding shutters are also known as “Indian shutters”. This name is a misnomer; it is believed that they were called this because their function was to keep Indians and their arrows out of the home. However, interior shutters were not introduced until well after a need to defend a home against American Indians. Besides, they would have offered little protection from an American Indian tomahawk (Dunbar 1988:31). They were put up to protect the house from heat, light, and cold. The most important function in the Victorian house was protecting the expensive furniture from light damage.

Door Locks

The first archaeological evidence of locks was found in the palace of Khorsabad, built by the Assyrians around 8000 BC. The elements of the modern lock are found in a wooden lock from Egypt dating to 2000 BC. The Romans were the first to fashion locks of Egyptian design out of metal (Brown 1994:27). European locksmiths did not make any major changes to the basic door lock until the late 16th century (Travellog 1997). In the early 19th century, in America, an explosion of locksmithing technology occurred. Americans began to become increasingly concerned with the safety of their homes and valuables. Up until this time most households in Europe and America had servants that were always around to watch the house and keep everything safe. As the middle class began to emerge in the 19th century, they needed a way to protect against thievery. Locks before this time were poorly constructed and susceptible to being picked. Once houses were left empty, the need for more secure locks was apparent.

Many locks were patented during the mid 19th century. Carole L. Perrault has cataloged more than 350 patents for locks and latches granted from 1826 to 1859 (1976:37-69). One of these patents, number 20,850, was given on 6 July 1858 to John Philip Lipps (Appendix B). His improvement to the latch claimed to make it unpickable which would make the home safer. This lock's innovation is an independent bit with a spring that allows only the key to be inserted, thereby, not allowing any lock picking tool to be used on it (Lipps 1858). The Lipps lock contains a second form of security. A hook on the back plate of the lock totally disables the key mechanism and only allows the door to be opened from the inside (Lipps 1858). If someone were to find a lost key, he or she would not be able to insert it into the lock, keeping all burglars out.

The lock invented by Lipps appears to be the one found in the *Brother Jonathan* crate. The first clue is the key (Figure 5.6). Keys are included in each package of locks; they are brass and have a slot on the barrel where the iron teeth were. However, due to their prolonged stay in the ocean, the iron teeth have corroded. Their existence is evidenced by iron residue in the slot as well as the illustration in the Russell & Erwin catalog. The key illustrated in Lipps' patent has the same unusual shape as those recovered. However, there are no teeth illustrated, so the patent drawing looks exactly like the recovered keys.

Figure 5.6: Key from Lipps lock package (BJ-17-45). *Photography by C. Sowden.*

The second indication that the recovered lock is the same as the one patented by Lipps is the unusual shape (Figure 5.7a, b, and c). The recovered locks have a protruding cylinder, similar to the patent, where the key would be inserted; this cylinder is brass. The catalog also illustrates a brass protrusion where the key would be inserted to unlock the door. This appears to be a feature unique to this lock; many other locks and pictures of locks have been reviewed, and none seem to possess a protruding cylinder. Most cylinder keyholes are enclosed in the case of the lock and the key would be inserted into the interior of the case.

The rest of the lock consists of brass interior workings and a cast iron case. The illustration from the catalog shows a maker's mark from the Russell and Erwin Manufacturing Co. However, this has not been found on the artifacts from the *Brother Jonathan* crate.

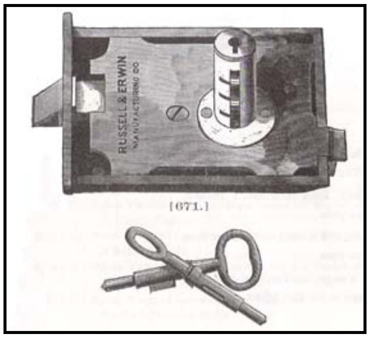


Figure 5.7a: Lipps lock from the 1865 Russell and Erwin Manufacturing Company catalog (Russell and Erwin Manufacturing Company 1865:7).

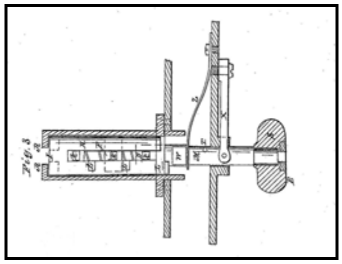


Figure 5.7b – Lipps Patent drawing (1858:1).

Figure 5.7c: A Lipps lock in the Lock Museum of America, Terryville, Connecticut. *Photography by C. Sowden.*

The catalog describes the lock as a “patent cylinder rim night latch”. Each of those words has a distinct meaning. “Patent” obviously refers to John Lipps’ patent, number 20,850 (See Appendix B). “Cylinder” is in reference to an important piece of the lock that was invented by Linus Yale, Jr. in 1841 (United States Patent Office 1976:16). The cylinder is where the keyhole and the tumbler mechanism were enclosed in a cylinder separate from the casing (Priess 1979:52). “Rim” refers to where the lock sits on the door. A rim lock is one that attaches on the exterior of the door; it is not built into the door (Priess 1979:65). “Night” refers to how the lock operates. Most night locks are ones that can be opened from the interior using just a doorknob, but need a key to open from the exterior (Priess 1979:62). At night, to secure the house, the hook that deactivated the key mechanism would probably have been set. “Latch” refers to the actual piece of metal which locks the door. A latch lock is one that is mounted on a spring and pops into place without the use of a key (Priess 1979:59). Latches are often operable with a handle, such as the lock in question, able to be opened from the interior by use of a doorknob.

There is one package of locks in the *Brother Jonathan* crate with six locks in it (BJ-17-45). Within the large package, there are three smaller packages with two locks apiece. Each lock comes with two keys, as illustrated in the catalog drawing, and mounting hardware. Each pair of locks is opposite: one for a right-handed door and one for a left-handed door. Reversible locks were being manufactured at this time; the first one was patented in 1842 by J.P. Sherwood (Hammon 1994:59). A reversible lock was one that could be flipped and used on either a right or a left-handed door. However, they were difficult to install (Hammon 1997:34). Neil Hammon makes several other arguments as to why reversible locks were not as popular, but they are arguments that could be used for the Lipps lock. First, one key would work on many locks; the Lipps lock had one simple key (Hammon 1994:59). Second, reversible locks were difficult to pack for shipment; the Lipps lock, with its protruding cylinder, made its package bulky (Hammon 1997:34). Though Russell & Erwin had a reversible lock in their 1865 catalog, it was not until 1889 that they found a cheap and easy way to manufacture them. The reversible latch never overcame the traditional lock, especially in “fancier, more expensive buildings” (Hammon 1997:35-36).

Despite all of this, the catalog does not give the buyer the option of right or left-handed door locks. One can only assume that an equal number of each side would have been shipped to a storeowner placing an order with Russell and Erwin.

This particular lock is never mentioned in literature pertaining to locks and their advancement during the 19th century. There were so many innovations that it is possible that locks went in and out of use as quickly as the patents were awarded. However, the only other example or mention found was the similar lock displayed at the Lock Museum of America (Figure 5.7c).

Turnbuckles

The *Brother Jonathan* crate contains two other, different packages of locks. These locks are not for exterior or entrance doors; they are simple locks that the catalog terms "Turnbuckle, for French Windows" (Russell and Erwin Manufacturing Company 1865:50). The locks were found in two packages: the first, a package of five (BJ-17-68) and the second, a package of 12 (BJ-17-69). This is unusual because everything else recovered in the crate is in multiples of six and evenly distributed among the packages. It is possible that the storeowner only ordered 17 locks, but it is also possible that the person packing the shipment at the warehouse in San Francisco forgot to pack the 18th lock.

These locks are very different, much simpler, from the previously described locks (Figure 5.8). The entire turnbuckle, including its interior workings, is iron. Only the doorplates, the covers that protect the door around the mortise, are brass. The locks were built into a French window and had a handle of some kind to manipulate the turnbuckle. Locks built into a door were known as mortise locks, as opposed to the previously described rim locks (Priess 1979:62). The mechanism of the lock itself is very simple; there is a single tang that is the lock, and with the twist of the handle, it turns the tang into the accepting mortise in the partner door or wall. This lock is also much smaller than the Lipps lock; the case size is 2 1/8” x 1 3/8”. The night latch is 4” x 3”.

Figure 5.8: Simple turnbuckle for French windows (BJ-17-68). *Photography by C. Sowden.*

These locks have no keys and there is no keyhole in the faceplate. The turnbuckles would have been equipped with a handle to turn the tang. This handle could have been a knob, there were 18 packed in the crate, or a slender decorative handle. The exterior of the lock did not accept any handles; the windows or doors would have only been opened from the inside.

The term “French window” is a misnomer; French windows are actually doors. They are called windows perhaps because the majority of the door is glass. This lock, being for French windows, is another indication of the social class that would be purchasing this hardware. French windows are only found in large, wealthy houses; they would open onto a garden or patio.

Keys

One package of brass keys was discovered in the *Brother Jonathan* crate (BJ-17-70). It contains 36 keys, all of the same type (Figure 5.9). The 1865 Russell & Erwin Manufacturing Company's catalog lists 55 different types of brass keys, each corresponding to different classes of locks, which are also listed in the catalog.

Figure 5.9: Brass keys, BJ-17-70. *Photography by J. Swanson.*

The catalog illustrates the keys from the crate, but it is only drawn as an example for the Metropolitan Bow (the handle part of the key) and the class for the key is not listed (Figure 5.10) (Russell and Erwin Manufacturing Company 1865:55). The keys found have a regular, open circle bow, as shown on all other examples of keys in the catalog. Therefore, the corresponding lock for these keys is indeterminable. It is obvious that these keys are not for the locks previously discussed. The Lipps door lock was packed with keys, and it only takes one type of key; the two types are not at all similar. The turnbuckles do not use a key, just a handle. These keys go to an unknown lock that could be packed in another crate. In the summer of 1997, another crate was raised from the *Brother Jonathan*. The top appeared to have lock hardware (James R. Reedy 2001, pers. comm.). This crate is at the Institute for Western Maritime Archaeology in California; its excavation will hopefully shed light on these unidentified keys.

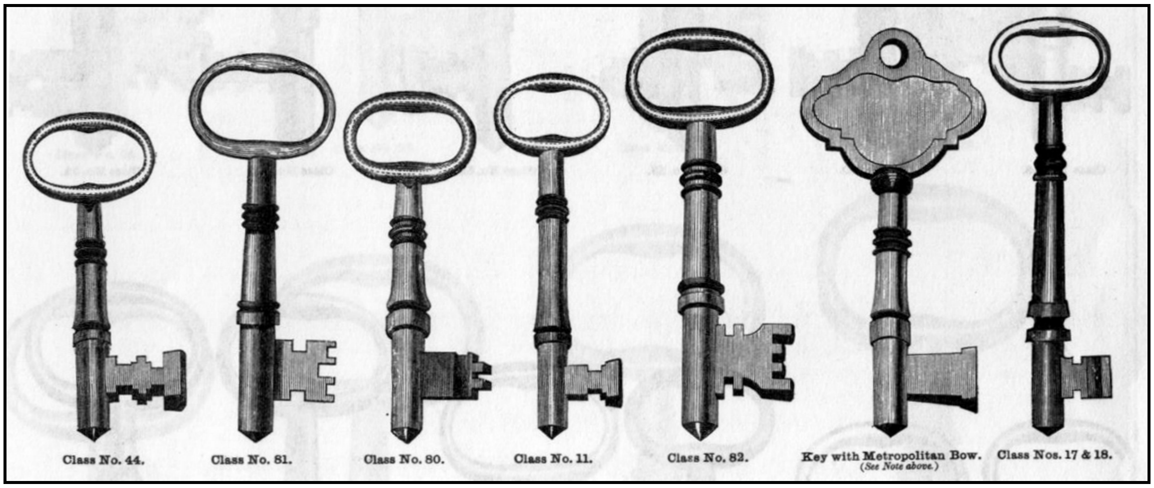


Figure 5.10: Key illustrations from the 1865 Russell and Erwin Manufacturing Company catalog. The key closest to those in the *Brother Jonathan* crate does not have a class (1865:55).

Doorknobs

Three packages of doorknobs were found in the crate (BJ-17-74, BJ-17-75, and BJ-17-92). Each package contains six knobs; however, the knobs, instead of being in pairs, are meant to be used singly. Most doorknobs are used in pairs, one on each side of the door. Typical hardware includes a long iron rod that goes through the door and connects the two knobs. The knobs from the crate have an iron rod, but it is only long enough to attach it to the latch mechanism. Each also has several pieces of hardware associated with it for attachment to the door or lock (Figure 5.11). The knobs are ceramic and brown with veins of white running through them. The catalog describes them as "mineral knobs" (Russell and Erwin Manufacturing Company 1865:66). This refers to the coloring of the ceramic, brown with veins of color, made to look like stone or rock. The definition of a mineral knob is coarse clay with a glaze over it to protect and enhance the color (Eastwood 2002). The mineral knob has a long history; they were originally made by English potters in the 18th century. American potters refuted the first United States patent for mineral ceramics as being a common practice and common knowledge with no new information (Eastwood 2002).

Figure 5.11: Doorknob with surviving hardware (BJ-17-75). *Photography by A. Borgens.*

Finding the specific patent that is associated with the *Brother Jonathan* doorknobs was surprisingly simple. While the first patent for mineral knobs was granted in 1841, the patent for the knobs under discussion is not actually for doorknobs (Eastwood 2002). John Philip Pepper patented a new technique on 16 December 1851 for an "improvement in mineral composition resembling jasper" (Appendix C) (Pepper

1851). This patent, number 8,592, was for the manufacture of clay for anything ceramic that the potter wanted to look like jasper. The witness for the patent was Henry E. Russell, of the Russell and Erwin Manufacturing Company. In 1850, Russell and Erwin bought out Albany Argillo Works, a company run by Pepper (Eastwood 2002). In 1851, after the patent was approved, Cornelius Erwin helped Pepper form The Mineral Knob Company (Ball and Ball Antique Hardware Reproductions 2002). Pepper supplied doorknobs to many of the New Britain, Connecticut hardware companies for "thousands of locks" (Hennessy 1976:33; Ball and Ball Antique Hardware Reproductions 2002).

The use of these doorknobs in relation to other artifacts in the crate is unknown; they could be for the door locks. There are six locks; each lock needs only one doorknob. These locks would have been one of the few opportunities to use a single doorknob. If they are for the turnbuckles, there are too many knobs. There are 17 turnbuckles and 18 knobs. This is evidence to the theory that the wrong number of turnbuckles was shipped.

There are 18 doorknobs and only six door locks. Like the door rails, perhaps the storeowner ordered extra for other clients. There are definitely more locks in another crate recovered from the *Brother Jonathan*, which could be part of the same shipment from The Russell and Erwin Manufacturing Company (James R. Reedy 2001, pers. comm.). It is possible that the extra doorknobs go to these locks. Despite the quantity difference, it does seem more likely that these knobs are to be used with the Lipps locks and not with the turnbuckles.

While several of the previous artifacts were obviously meant for large, expensive homes, these knobs are more all-purpose, every man hardware. The rich did use these knobs, but the embellished brass knobs of the time were considered higher quality.

Wardrobe Hooks

One of the interesting features to come from the excavation was the great quantity of wardrobe hooks. The number of artifacts recovered in each class is a modest amount: six door locks, 18 doorknobs, 17 French window turnbuckles, hardware for six sets of pocket doors, and hardware for a reasonable number of sliding shutters. However, within the *Brother Jonathan* crate, there are eight packages of iron wardrobe hooks (BJ-17-37, BJ-17-42, BJ-17-44, BJ-17-46, BJ-17-59, BJ-17-64, BJ-17-66, and BJ-17-72) (Figure 5.12). Each package contains 72 hooks; that is 576 hooks.

Figure 5.12: Wardrobe hooks in situ. (BJ-17-66). *Photography by A. Borgens.*

Complicating the problem is that most photographs of Victorian bedrooms show bureaus, large wardrobes, and closets for the storage of clothes. Hooks of this nature would not be used in fine Victorian homes, but in environments that were more rustic, perhaps a cloak room or back porch. It is probable that, unlike the rest of the hardware, these hooks are intended for the gold mining camps.

The *Brother Jonathan* had a long career of carrying supplies for the gold rush: first on the east coast side of the Panama and Nicaragua routes, then on the west coast as the California gold rush became full fledged, and finally working the path north as people followed their dreams into present day Canada. With so many hooks, the storeowner must have been expecting a large client base. This would be the perfect item in the outback of a mining camp. Large furniture, such as a wardrobe, was not something that would have been carried to a claim site. The large amount of hooks is a cheap way to hang clothes for a large customer base in need.

Comparisons

While archaeological parallels would be appropriate in this style of study, the same problem is encountered as when doing the historic research. These objects are, at times, so inconsequential that they are rarely written about or even commented on. It is known that locks, doorknobs, keys, miscellaneous lock parts, window frames, and window glass were found on the *Bertrand* (Petsche 1974:49). Door locks, door lock hardware, rope guides, doorknobs, coat hooks, and sash pulleys were found on the *Arabia* (Corbin 2000:135-146). These are two of the most important archaeological comparisons that can be made to the artifacts under discussion. Both are steamships headed to the west – Montana – with shipments of goods, some coming from boxes labeled with the manufactures stamp and the consignees address on the surface.

However, neither of these wrecks has received much scholarly work. Pictorial evidence from popular books on the *Arabia* shows mineral knobs in pairs, brass keys, and even a sheave for a top hung pocket door (Hawley 1995:58).

Conclusion

The architectural artifacts from the *Brother Jonathan* crate tell several different stories. General stores in Portland, Oregon and Victoria, British Columbia had a diverse cliental. They were stocking hardware for pocket doors and sliding shutters that, due to the expense of installation, are only found in large, wealthy homes. The Lipps locks and doorknobs are two pieces that could be found in a wealthy or middle class home. Due to the simplicity of the doorknobs, they are more likely for middle class homes. The French window turnbuckles, a simple piece of hardware, are for an expensive item. No middle to lower class family had need of a door full of windows onto a garden or patio. Since the locks to which the keys belong are unknown, any social commentary on them is impossible. Though the only pictorial evidence of wardrobe hook use is for the American gentry, it is most likely that these were for the men and families in the gold fields, doing the best that they could to find their fortune.

While it is nice to try and link the architectural hardware together to form complete sets, there is no reason to assume that the contents of the crate represent a single order. Parts of the order may well be multiple shops and were shipped in the same crate.

Though much of the architectural hardware seems to be for the rich in the Northwest, an analysis of the rest of the *Brother Jonathan* crate's contents will give a more complete picture of the recipient general store and it's cliental.

CHAPTER VI

TOOLS

The *Brother Jonathan* crate contained items that made life easier as well as items that were necessary to life. The tools fall into both of those categories. Some of the tools in the crate are basic necessities, every person owned one and used it regularly; others were more specific to certain tasks. Axes, hatchets, and coal shovels are tools that would have been found in every household. Scythes, tap augers, and plumb bobs are for more specific work and were not necessarily used by every family or homestead.

Axes

The 12 wrought iron fawn-footed handled hafted axes with steel bit inserts found in the crate represent the long history of the axe (BJ-17-05 and BJ-17-06). Cutting implements were among the first tools created by ancient man. The axe, as we know it today has gone through several permutations. Man's first tools were found objects that had a sharp edge. Next came items resulting from flint napping that were tied onto a wooden handle. This was followed by hammering hardened copper into shape. Once the knowledge of bronze making was discovered, man began to cast axes out of bronze. It wasn't until 1400BC that the Hittites learned how to forge and temper iron, a process they alone knew for 300 years (Barlow 2003:26). But, even with the evolution of cast iron in the 14th century, the axe was still made of wrought iron well into the 19th century.

The most important tool to any man trying to make his way in the world is the axe. It is capable of doing almost everything: felling trees to clear land, building bridges to cross rivers, shaping the trees to build shelter, chopping wood for fuel to heat the shelter, killing wild animals to protect the family, creating traps to capture animals for food, butchering the animals to feed the family, and shaving so there would be a clean face every morning (Sloane 1973:10; Barlow 2003:26). The axe could substitute for almost any other hand tool in a pinch, and because of this, if a man could only have one tool, it would always be an axe.

In fact, axes were so important in the New World they were one of the first items mass produced in America. In 1822 there were 22 companies selling axes but they were all imported from England. By 1826, Samuel Collins of Hartford, CT had eight employees and produced 64 axes a day (Barlow 2003:26). This was an improvement over the local blacksmith working by himself, where most tools were being made, and started to give some real independence to the new country.

Axes were constructed by folding over a piece of iron and welding it together. In 1744, a steel bit was introduced and it was inserted to the end of the axe and the iron was forge welded to it (Barlow 2003:26). The thick poll was a uniquely American attribute and was developed to help make a stronger weld, but ended up giving two added benefits, balance and a strong hammering surface(Sloane 1973:10; Heavrin 1998:114).

The *Brother Jonathan* crate axes are described as hafted and having a fawn-footed handle (Figure 6.1). Hafted refers to the style of axe; the cutting edge is parallel with the handle (Heavrin 1998:vii). Fawn-footed handles describe the style of the butt end of the handle; it is slightly curved and the extreme end is cut at an angle. Prior to the Civil War, most axes were not sold with handles. Axes were unique to their owner; each man had a handle pattern that they had developed for their own use. These homemade handles tended to be straighter than the curved fawn-footed handles found with the *Brother Jonathan* crate.

Figure 6.1: Fawn footed hafted axe with RTV cast head (BJ-17-06). *Photography by A. Borgens.*

Early catalogs show over 50 varieties of axes, each, ideally for a unique use, but all interchangeable (Sloane 1973:12). The *Brother Jonathan* axes can be described as felling axes, but more specifically a wedge type felling axe. This shape seems to be prevalent in America as it is also known as the American Axe, American Felling Axe, and Yankee Axe (Salaman 1990:55). It is described has having a heavy poll, which is known to be an American trait. While felling axes were intended to be for tree cutting, the simplicity of their design made them ideal as a utilitarian tool. As a utilitarian tool, it was the most important item to a family trying to settle in the Pacific Northwest.

Hatchets

The history of the hatchet is an offshoot of the story of the axe. The word hatchet actually means “little axe” (Blackburn 1998:249). The big difference between the two is that the hatchet is designed as a single handed tool, while the axe is usually used with two hands (Figure 6.2). It was initially designed to help cut and form shingles. The blade is flared slightly and often has a heavy, concentrated poll for hammering nails, as do the examples from the *Brother Jonathan* crate (Sloane 1973:20). They were one of the few hand tools that would have been sold with a handle in the early 19th century (Heavrin 1998:123). While some historians as well as users today, describe them as job specific tools, the hatchet seems utilitarian, as a smaller option than the axe. The inclusion of 12 hatchets in the crate, the same amount as axes, indicates that the merchant expected to sell just as many hatchets (BJ-17-33 and BJ-17-62). This leads to the belief that the axes were not the only "must-have" tool.

Figure 6.2: Hatchet with RTV cast head (BJ-17-62). *Photography by A. Borgens.*

Coal Shovels

The *Brother Jonathan* crate contained 12 small coal shovels with the scoop made of wrought iron and the handle of wood; half of the shovels had a brass cuff over the wooden handle (BJ-17-67 and BJ-17-93) (Figure 6.3). The size of the shovel indicates that these were meant for home or personal use for scooping coal or even removing ash from the fireplace. The shovel is size prohibitive to be for a large commercial fire, such as one that a blacksmith would work with. The shovels are of a very plain style; they were intended either for a kitchen fire or a house that did not stand on ceremony with extravagant fireplace tools. Again, this is an essential element to maintain a fireplace in most homes, so it seems likely that it would be a staple in any dry goods store.

Figure 6.3: Coal shovels in situ (BJ-17-93). *Photography by C. Sowden.*

Coal shovels were one of the first items ever mass produced in the United States. Pittsburgh was home to a factory that made shovels, one of the first implement factories in the country (Barlow 2003:28).

Tap Augers

The crate contained nine augers of varying sizes (Handles – BJ-17-43, BJ-17-60, BJ-17-61, BJ-17-63, BJ-17-71, BJ-17-77, BJ-17-78, BJ-17-79, and BJ-17-80 Tool packages – BJ-17-76, BJ-17-90, and BJ-17-91). Judging from the handles, there were three different sizes (Figure 6.4). Augers, in a general sense, are used for drilling holes by hand and have been in use since early Roman times (Salaman 1990:31). The simplest auger, and the most common, consists of a bit and a perpendicular handle which formed a “T” (Kean and Pollack 1990:5). The twist auger, similar to today’s drill bit was not seen until the late 18th century (Kean and Pollack 1990:5; Salaman 1990:31).

Figure 6.4: Two small, one medium, and one large tap borer handle. *Photography by A. Borgens.*

Since the tool portion of the auger, or the bit, was made of wrought iron, it did not survive the 135 years in salt water; the only trace left of its existence are X-rays taken of the surviving paper package wrapped around each group of three (Figure 4.34b). From these, it is easy to see that the auger is a scoop with a tiny screw tip. A thorough review of the Russell and Erwin Manufacturing Company’s 1865 catalog finally identified these tools as tap borers and they are sold by the diameter of the maximum size hole it will make from ¾” to 3” (1865:196). The two sizes that have been positively identified in the *Brother Jonathan* crate are 1 1/2” and 1 3/4” diameter. The handle shown in the catalog does not exactly match those discovered in the crate, but the style may have changed over time. There were four common types of handles for augers winged, centre boss, turned, and straight, with the *Brother Jonathan* type belonging to the turned category (Salaman 1990:31).

The tap auger is a general term for augers that have bits in the shape of a conical half-funnel. Tap borers have several other names including taper auger, cooper's bung borer, and ring punch. The lower end, or nose, of the bit can have several different forms, open, spoon shaped, side cutting lipped, or screw lead (Salaman 1990:40-41). The *Brother Jonathan* augers have the screw lead nose; this is the only type that does not need a tap hole. Because of the screw nose, the auger can only be used in one direction, so only one side of the half-funnel is sharpened (Sloane 1973:74). Due to its conical shape, the auger, obviously, produces a tapered hole.

The tap borer or auger is a very specific tool, used by mostly one profession. A cooper used a tap borer in two places, the first on the side of the barrel at the greatest diameter and the tapered hole would have been filled with a bung. The second hole would have been made on the top of the cask, to be tapped; a wood or brass tap would b inserted to dispense the contents. Sometimes this hole was not completed until the cask reached its final destination and the shop owner would actually tap the cask. The cooper's bung borer tended to be a larger auger, giving a larger hole; most likely these were used for the side hole described above. The tap borer was smaller, producing a hole averaging in diameter about two inches; it was meant to be used by one hand (Blackburn 2000:3-4). Both of these tools would have been turned by one hand.

A tool so specific in nature is unusual in a chest full of items that were meant for the general public. There are several possible reasons for their inclusion in the crate.

First, the augers could be for the shop owner himself; as previously mentioned, merchants regularly tapped barrels to dispense goods. He could have purchased some different sized augers to tap differing barrels of goods. While this is likely, it seems unlikely that one shop keeper would need nine different tap augers, six all of one size. The second possibility involves a specific order for a resident cooper. This resident cooper could have contracted with the merchant to make the order for him. Again, though, it seems unusual that one cooper would need six tap augers of the same size. It is possible that Pacific Northwest residents used these augers for another purpose not specified here.

Scythes

Farming was an important industry to the settlers of the northwest. While many immigrants came to search for gold, they quickly found out that there was not enough to sustain a livelihood in the Pacific Northwest. Some returned to the east coast, but many remained and staked a claim for a farm. The climate of the west coast was ideal for growing wheat and it quickly became one of the primary exports. In the 1860s, shippers in San Francisco were sending California wheat all over the world: Great Britain, Australia, China, and the East Coast. However, further north, the farmers were more isolated and farming was not an "industry" until the railroad was built into the area in the 1880s (Hurt 1994:184).

Wheat farming required two important tools: a plow for planting, and scythes for harvest. Like many of the other tools, scythes have a long and extensive history. Their recorded use dates to the Old Testament; Romans had two-handled scythes at least 100 years before the birth of Christ. Initially, scythes were not used for wheat; it had a violent action that bruised and caused the stalks to loose the grain. The smaller, gentler sickle was often used to harvest wheat until the 16th century. At that time, the Flemish developed a wooden cradle that attached directly to the scythe that allowed the reaper to carefully catch and support the wheat and the precious berries (Barlow 2003:28). It has continued to be in use until the early 20th century (Vince 1982:126).

With the development of new reaping machinery in the late 19th and early 20th centuries, the scythe quickly became obsolete. They are large and clumsy to use and take a lot of skill to wield successfully. It takes a very strong man to handle a scythe at a constant pace for a full day. Most women could not manage a scythe and relied solely on the sickle. However, the sickle does not have the power that the scythe does; a scythe can cut one acre of hay, barley, or oats in one day while a sickle can only do one-quarter acre (Vince 1982:127).

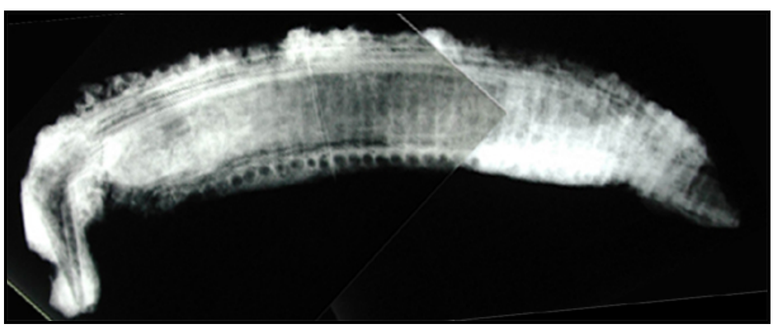


Figure 6.5: X-ray of scythes in package (BJ-17-29). *Photography by C. Sowden and A. Borgens.*

The *Brother Jonathan* scythes were sent with blades only (Figure 6.5). Douglas Hurt, a noted historian of American farming and farm implements, believes that, most likely, the handles for the scythes would have been part of the *Brother Jonathan* cargo. Most farmers at this time would not have the time or skill to craft a handle with proper curvature to make the scythe easy to use. Hurt goes on to say that if the scythes were meant to be attached to cradles, that they would defiantly be part of the shipment; the cradle was a complicated contraption and more often than not, purchased with the scythe blade (2005, pers. comm.). The Russell and Erwin Manufacturing Company catalog from 1865 shows the scythe blades as individual components without handles and cradles. However, there is a large section of the scythe advertisement devoted to "snathes" or the handles and the cradles (Russell and Erwin Manufacturing Company 1865:297).

However, Hurt further suggests that the blades may have been sent as replacements for farmers that already own handles and cradles (2005, pers. comm.). Scythes had to be sharpened regularly; this would mean that replacement of the blade would be a standard occurrence, creating the possibility that the *Brother Jonathan* shipment did not contain handles and cradles for all 12 scythe blades.

The blades were marked with a maker's mark and a packing slip with the names: CHARLES ALLEN / GERMAN STEEL (Figure 6.6). Unfortunately, the identity of this maker remains unknown. In fact, the name is not even mentioned in the Russell and Erwin Manufacturing Company's 1865 catalog. All of the scythes are in the rear of the catalog in the consignment section. Charles Allen was probably a small manufacturer who contracted with Russell and Erwin Manufacturing Company to advertise and sell his products and may not have been with the company when the catalog was published.

Figure 6.6: Label found inside scythe package with maker’s name: Charles Allen (BJ-17-29). *Photography by A. Borgens.*

Plumb bobs

The six plumb bobs excavated from the crate were some of the prettiest artifacts recovered, and some of the most useful (Figure 6.7). Plumb bobs are usually made from something heavy, like stone, steel, brass, or lead, from which they get their name. Used alone on a string they mark a point directly below another point (Blackburn 2000:108-109). For this purpose, they are still used today in many fields, including archaeology. However, in the past, they held a greater place in levels. “A” or “T”-levels were used to check the preciseness of a horizontal component. A plumb bob was suspended in a wooden frame, either in the shape of an “A” or a “T”. The structure is straight when the bob hangs in front of the center line on the cross bar. The A-level has been used in some form since the time of the ancient Egyptians (Salaman 1990:260). Today spirit levels, which use a liquid capsule, are more prominent.

Figure 6.7: Conserved plumb bob (BJ-17-24). *Photography by J. Swanson.*

There are two other types of levels in which plumb bobs are used. The plumb board or plumb rule was used to check vertical straightness. This level placed the bob in the cut out center of a vertical plank. When the bob hung directly in the center, the timber was vertical. The plumb square provided a reference for both vertical and horizontal measurements (Salaman 1990:260).

Conclusion

The tools represent a wide range of uses; many are multi use tools. The tap augers are the most specific use tool and present the most questions of all the artifacts as to why they would be included in this crate of hardware. The axes, hatchets, and coal shovels were tools that were prevalent in many areas, including cities as well as rural areas. The rest of the tools seem to indicate a destination that would cater to builders and well as farmers. The inclusion of the architectural hardware along with the plumb bobs suggests that this crate of hardware was meant for a community that was under construction.

CHAPTER VII

FUR TRAPPING AND FOOD

Of all the artifacts in the *Brother Jonathan* crate, some of the most important to a newly settled family in the wilds of the Pacific Northwest would be those items which could capture and prepare food. The two artifacts that are included in this category are the animal traps and the meat mincers.

Traps

Men have been trapping animals for food and for their fur since they began making tools. The history of the long spring trap, also known as the steel trap or gin trap, the form discovered in the crate, is lengthy. It has its origins in the "torsion" trap that has been used in Asia, Africa, and Europe since before the birth of Christ (Gerstell 1985:21). A hunting book by Petrus de Crescentiis, published in the early 14th century contains the first mention of a trap made of iron (Gerstell 1985:26). From these early beginnings evolved the trap that is still used today; it was produced by many, but perfected by Sewell Newhouse and the Oneida Community. Richard Gerstell defines this type of trap as

> Fitted with one or two springs that lie outside of, or extend beyond, the trap jaws. They may have two pierced crossed, or single piece round, square, or oval bars. Most common spring is "V" or "U" shaped and has an eye at each end. Upper one surrounds and moves up and down on narrow jaw ends. Lower eyes loosely circles the jaw post and helps hold the spring in place. Possible to turn spring side to side (1985:33).

This style of trap was very popular in America and helped define the nature of the North American fur trade. Traps from in this area were initially made solely by country blacksmiths, the rise of the fur trade in North America propelled them into mass production (Bateman 1971:191). The Hudson Bay Company began on the foundation of beaver trapping done exclusively with long spring traps. Many other fur trading companies began in the mid to late 18th century, but only the Hudson Bay Company continued to play a significant role in the mid 19th century, when the *Brother Jonathan* sank (Gerstell 1985:168). They were active, with government approval, in developing large areas of land, especially in what is now Canada. In 1849, they were granted the responsibility for settling and colonizing Vancouver Island, a possible destination for the crate of goods in question (Gerstell 1985:168).

In the mid 18th century, most of the traps that were produced were of the size appropriate to snare beavers. But, 100 years later, the majority of traps was smaller and designed to catch muskrat.

Traps were used for activities besides the fur trade. The U.S. Office of Indian Trade used them as barter items, exchanging them for skins or cash. Sometimes they were used as incentives or peace offerings when signing treaties (Bateman 1971:192). One instance had the government exchanging traps for a captive boy that the Native Americans were about to torture (Gerstell 1985:18).

Sewell Newhouse

The person that is generally credited with introducing mass production of steel traps was Sewell Newhouse. As a young man of 14, his family moved to Oneida County in New York in 1820 (Bateman 1971:63). He began fabricating traps in his mid teen years for his own use; by the age of 17, he was producing about 50 each season. He financed the next year's traps by selling his used ones to Native Americans after the hunting season was over. Young Newhouse also made good use of available materials; he could temper springs from worn out axe blades (Bateman 1971:63). He worked on his own for the next 20 years, sometimes hiring on a few helpers. The largest production that he had during that time was 2000 traps in one year (Bateman 1971:63-64).

In 1850, Newhouse, with his wife and son, joined the Oneida Community, a religious commune that was formed in 1848 by John Humphrey Noyes. Initially, Noyes had planned on sustaining the Community by profiting from their farming and food preserves. Since it was still a new venture, all members worked in the fields and helped build the main housing structure. Newhouse gave up the majority of his blacksmithing for the first few years he and his family were members.

In 1851 he and another member, Joel Higgens, made only five dozen traps; they were used to trade for honey. In 1852, they made somewhere between 15 and 20 dozen. By that winter, there were four men involved in the production of traps, Sewell Newhouse, Henry Thacker, John Hutchins, and his son John. P. Hutchins. These first Oneida traps were small, most likely for muskrat. In 1853, Newhouse, along with John Hutchins and his son designed and field tested new trap designs. Hutchins is credited with designing some of the larger sized traps (Klaw 1993:83). In 1855, Noyes realized that Newhouse possessed a skill and knowledge that could benefit the Oneida Community. He arranged to build a facility that had mass production capabilities (Gerstell 1985:176).

For the first four years (1851-1854), all of the traps were made by hand. By 1855, Noyes had moved machinist and Oneida member, William R. Inslee from a

Community branch in Newark, NJ out to the Oneida headquarters to help design mass production facilities (Foster 2001:287). He began by creating a machine to roll the jaws into shape instead of pounding them out by hand. Then he developed an apparatus to stamp out the springs resulting in a piece that only had to be bent and tempered by hand. Later, a revolving oven was produced that could temper up to 5000 springs at one time (Klaw 1993:83). Prior to 1855, the community purchased chain from England, rather than making their own. They sold traps with and without the chain. In 1855, they started making chain by hand; often, this was a task that could be accomplished by lesser skilled workers or even children. In 1860, Inslee produced a machine that could manufacture 30,000 links of chain a day. However, each link still needed to be welded shut (Gerstell 1985:178-180).

The success of the Newhouse traps came about due to three important factors. First, the traps were well made and trappers noticed a difference when they used them (Bateman 1971:64). Second, the community utilized their field salesmen as information gatherers, not just salesmen. Their reports helped fuel changes in the production and the introduction of new models. Third, John Noyes knew how to promote and advertise. He organized a sales effort that lifted the small Oneida blacksmith shop, which made 9640 traps between 1853 and 1855, to a facility that made 45,261 traps in 1859 and over 270,000 in 1864 (Gerstell 1985:177). Orders were so large that at times the school was closed so the children could help with chain production all day long (Foster 2001:288). Actually, the initial sales effort was a secondary aspect to their recruitment trips to find new members for the community (Foster 2001:200-201). Eventually, as income from the traps became the primary source for the Community, the sales effort included fairs and expositions, community papers, and *The Trapper's Guide*, a 118 page paper back book written by Sewell Newhouse and used for years as the guide on how to trap (Gerstell 1985:183).

By 1862, there were six different sizes of traps being produced (Gerstell 1985:178). They ranged from the small, No.1 trap for muskrat all the way up to the No. 6 trap for large bear. In 1864, the No.1 trap with chain, sold for $6.50/doz, while the No.6 trap with chain sold for $18.50/each (Gerstell 1985:180). This was an improvement from the muskrat trap which was the only size produced in the early days. In late 1865, Oneida introduced two new sizes, the No.0 for rat and the No. 1 ½ for mink (Gerstell 1985:181). The traps recovered from the *Brother Jonathan* crate were six No. 1 traps, for muskrat and 24 No. 2 traps for fox and otter.

By 1865, a new facility was built just to manufacture traps. Each area - forge shop, chain room, tumbling room, finishing area, and shipping section - was powered by water (Gerstell 1985:180). While traps were the main source of income for the Community, they supplemented it with the production of palm leaf hats, gold chain, brooms, collars, flour, bee hives, mop wringers, rustic seats, and traveling bags (Carden 1969:42; Foster 2001:286).

Traps are most often dated by the manufacturer stamp on them. Oneida Community started stamping their mark on the springs prior to 1860. Robert Gerstell (1985:185) has been unable to establish when the Community began stamping the pans; he theorizes as early as the mid-1860s. The discovery of the traps in the *Brother*

Jonathan crate confirms this theory; they were stamped in the pan and would have been most likely manufactured in 1864. The *Brother Jonathan* artifacts show stamping around the edge of the pan: S. NEWHOUSE ONEIDA COMMUNITY NY. Due to the poor state of preservation, only one pan showed any signs of center stamping to indicate the size: No. (Figure 7.1). The size on all of the recovered pans was obliterated.

Figure 7.1: Step pan from Newhouse trap (BJ-17-51). *Photography by C. Sowden.*

The Oneida Community promoted Sewell Newhouse as an avid trapper and many believed that he was heavily involved with the trap business until the dissolution of the Community in 1880. However, many histories that are based on personal diaries and discussions with Oneida Community members reveal that he was dictatorial and resistant to change (Gerstell 1985:187; Klaw 1993:82-83). He was opposed in 1855 to a change proposed for machines to produce the product. When the new trap plant was built in 1865, he was given his own workshop in the plant and often worked in there by himself and did not assist with the production of traps. In all of the Oneida papers, there was only one mention of him ever going out to trap, and that was in 1875 (Gerstell 1985:188).

Trap Use

These traps could have been used for almost anything in the Pacific Northwest. Since the sizes were smaller, for muskrat, fox, and otter, it is likely that they were intended for the fur trade. Some of the smaller traps, like the muskrat trap, were used for pest elimination. Since the length of chain packed into the box was indistinguishable, it is impossible to be able to tell if all of the traps were sent with chain. However, six distinct rings were located, it can be hypothesized that the larger traps were sent in groups of four. However, a full time trapper would have had a variety of traps, much more than what was being purchased at the proposed general store.

Meat Mincers

The ability to preserve and store food could make or break a rural family in the 19th century. If a cow or hog was slaughtered, it would provide enough meat to feed a family of four for much longer than the meat would remain fresh. They needed tools to assist with food preservation. Meat grinders were one such tool. They allowed meat to be salted and spiced, stored in a casing that could be smoked, and kept for a long period of time.

Sausage, as a means of storing fresh meat, has been around for more than 4000 years; it was first mentioned in text by Homer in *The Odyssey* (Jones 2002:5). During the development of Christianity, pagans tended to favor it, so the Christian emperors banned the making of it (Jones 2002:6).

In the early 19th century, the normal diet for the wilderness as well as developed areas was corn, potatoes, pork, bread, and butter. Pork was favored for a couple of reasons: pigs were easy to keep, they matured quickly, and they had excellent curing qualities. At this time, beef was too expensive to raise and to purchase for the average family (McIntosh 1995:82). However, by the 1860s, beef was beginning to come into vogue and pork was falling out of favor, except for hams (Schremp 1996:30).

The grinder was one of the most important tools for the kitchen in the mid 19th century. Women could quickly mince meat, seafood, and vegetables for sausage or hash (Schremp 1996:35).

There were many different types of meat grinders; the most commonly known today by antique collectors is the single-barreled grinders that are mounted on the edge of a counter or table. However, for a short time, a doubled barreled meat grinder was the rage. Many different styles were patented for their improved use.

The grinders from the *Brother Jonathan* crate are a good illustration of the double-barreled grinders that were popular during the 1860s (Figure 7.2). The markings on the case made the grinder easy to identify: PATENTED\MARCH 15\1859. The patent records show that Albert W. Hale of New Britain, Connecticut was issued U.S. Patent #23,246 for his “Meat-Mincer” (Appendix D). The machine was described in the patent as a “new and Improved Machine for Cutting or Mincing Meat, Vegetables, &c” (Hale 1859). The patent contains a full description of the workings of the grinder and how each part is specially designed to mince meat in the best manner. The most important part of the patent revolves around the cylinders; they have “tapering grooves extending from end to end”, they work against a ribbed case, and they rotate to bring the item being minced across a knife in the center of the case (Hale 1859).

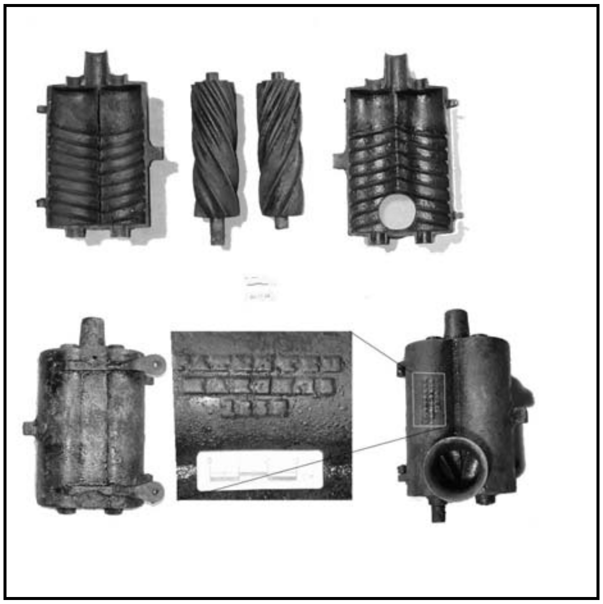


Figure 7.2: Meat mincer from the *Brother Jonathan* Crate (BJ-17-09). *Photography by A. Borgens.*

The meat grinders that were recovered from the crate contained all of the parts described in the patent except for the knife. Evidence of the knife was seen in one of the grinders (BJ-17-27), but it did not survive excavation (Figure 4.13). Mr. Hale mentions that most of the machine should be cast, but the knife would be much bettered if “rolled out the desired ship, and tempered or hardened” (Hale 1859). None of the wrought iron items survived in the crate, including the axe heads, hatchet heads, and traps, so the loss of the knife is not surprising and is almost to be expected. The patent also mentions that cylinders could be cast, rolled, or forged; due to their preservation, it can be concluded that those recovered were cast.

Mr. Hale had his patented reissued on 26 December 1865, after the *Brother Jonathan* sank. The only difference between RE2136 and the original patent is the developments Mr. Hale wishes to patent are more explicitly stated (Appendix D). He lists six specifications, all having to do with the tapered cylinders, that are his patented ideas and improvements; the first patent only gave a brief statement as to what Hale claimed "as [his] invention and desire to secure by Letters Patent" (Hale 1859, 1865).

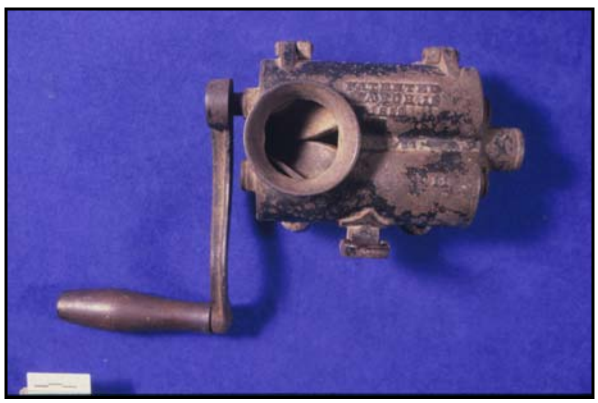


Figure 7.3: Number 11 grinder purchased on Ebay.com. *Photography by A. Borgens.*

Parallels to this grinder were discovered, in all places, on EBay.com, the auction web site. Several times over the last few years, a Hale meat-mincer has been advertised, sometimes as a coffee grinder or a tobacco grinder; two have been purchased in order to compare specimens in good condition with those recovered from the crate (Figure 7.3). Descriptions of many of them showed one difference between the *Brother Jonathan* grinders and those being advertised. The ones being sold have, most of the time, a small number cast into the case in the same manner as the patent date. The number appears in the lower right corner when looking at the patent date. The three numbers that appear are 11, 12, and 13. Both of the E-bay examples were stamped with: 11. The Russell and Erwin Manufacturing Company catalog advertises three sizes of this grinder: #11 had a five inch cylinder, #12 had a six inch cylinder, and #13 had a 7 ½ inch cylinder (1865:104). Evidentially the sizes were not yet being cast into the case when the *Brother Jonathan* sank in 1865. The two sizes recovered from the crate correspond to the #12 and #13 grinders (Figure 7.4).

Figure 7.4: Number 12 and 13 grinders from the *Brother Jonathan* crate. *Photography by J. Swanson.*

The catalog gives the grinder a hearty endorsement; "We can without hesitation offer this Cutter as the best article in use for the purpose. It will cut more rapidly (not TEAR the meat), is more simple in construction, having but one knife which is self-sharpening, and easier cleaned than any Cutter made" (Russell and Erwin Manufacturing Company 1865:104). This claims mirrors one that Hale makes in his patent application.

"The whole is simple in construction, not liable to get out of order, and every part is easily cleaned and kept sweet for use" (Hale 1859). The good use of the grinder is even further endorsed by the New Britain Record in 1866. The newspaper had a series covering all of the local manufacturers; the Russell & Erwin Manufacturing Company was profiled on 6 April 1866. Along with a history of the company and their current status, a short list of "leading articles" was given; among these, the patented meat-mincer was singled out.

> While every article manufactured seems to be absolutely indispensable, the meat cutters and bake pans are deserving of special mention. Of the former, it is only necessary to say that no family which has ever used one would dispense with it, and no butcher who has ever had on of the kind made expressly for those in his business would think his establishment complete without it (*New Britain Record* 1866).

Obviously, the manufacturer advertised the Hale meat-mincer to be much more than an ordinary grinder.

Conclusion

The inclusion of traps seems to indicate a different destination than the architectural elements did. Traps would not be useful in a large metropolitan area, like Portland or Victoria. Trappers need uninhabited areas with less human pollution. The grinder would be useful in any kitchen in the city or the country. Neither of these artifact categories contributed any data on the final destination of the crate of goods.

CHAPTER VIII

PERSONAL ITEMS

Leather has been used in clothing as long as man has been killing animals for food. Unfortunately, innocuous items like belts are often over looked when describing fashion or researching historic costumes. Even worse, most research into historic clothing focuses on the middle and upper classes that probably lived in large cities. Most illustrations are accompanied with text that talks about teas or morning walks. The leather found in the *Brother Jonathan* crate is quickly identifiable as not belonging to this category.

Belts

The six belts in the crate are very wide with little to no decoration (BJ-17-83). There is a single embossed line down the length of the belt (Figure 4.38). The two inch width indicates that these would most likely not have been used for women's costumes. Women who wore belts during this time mostly wore ones that were made of the same fabric of their shirt or skirt (O'Hara 1986:38). The belts are likely for a man who does heavy labor. They are most commonly seen in the practice of ranching. Cowboys wore two kinds of belts, one for their gun and a second for support (Kauffman 1980:146). The wide belts from the crate are likely for this second purpose: worn on the outside of a shirt and used to help support the back when lifting heavy objects. Men and women involved in mining as well as farming and other rural activities would have a great need for these belts.

Wide belts like these were useful to carry extra pouches with. During the 1850s and 1860s, British hunters wore a belt on the outside of their jacket on which they hung a small bag our pouch with shot (Peacock 1996:62, 75; Laver 2002:202-204). Using these large belts as "tool belts" in the modern sense of the word may have been a very practical use. As today's populations hang cell phones, I-pods, pocket knives, and other items deemed necessary for their daily life, off belts, so too could have miners and farmers. Small pouches hanging off these belts would allow them to keep their gold nuggets or seed close by and easy to access.

Sheaths

While published research on belts is minimal, the work done with leather knife sheaths is even less. Knives, like axes, have been used since man learned how to work stone. The sheath was invented so that man could carry his cutting utensil with him and not cut himself. Most knives, it seems from many sources, were made with or sold with an accompanying sheath. While knives were often sold without sheaths, it seems unusual to see sheathes sold without knives. The sheaths sold by the Russell and Erwin Manufacturing Company were not associated with any knives on any of the accompanying pages of their 1865 catalog. They were sold on the same page with sailor palms and dog collars, all the leather goods that the company consigned (Russell and Erwin Manufacturing Company 1865:416).

It was not unknown for knives to be made from found objects. Hunters and trappers often made their own knives out of files, rasps, or hatchets (Pacella 2002:113). These knives, if the maker wished to carry them, would require a sheath. The sheaths were likely utilitarian, a ready pocket to carry other small tools with; the catalog does not specify them as use for knives, but their use appears to be self evident.

The belts for these sheaths are much thinner and narrower than those of the belts described above (Figure 8.1). The only function they would have had would be to carry the sheath and whatever might be in it.

Figure 8.1: Several knife sheaths and accompanying belts (BJ-17-48). *Photography by J. Swanson.*

Conclusion

Like many items in the mid-19th century, the leather belts found in the crate were used for multiple purposes. The most prevalent use was probably for back support, a practice that is still used today. The knife sheaths, again, could have been used for many things, but to holster a knife seems to be the most obvious. Finding 36 in one crate seems like a lot, perhaps there were knives in one of the accompanying three other crates that went down with the *Brother Jonathan*.

CHAPTER IX

CONCLUSION

The study of the *Brother Jonathan* crate embodies the connection between the established east coast manufacturing sector, the gold rush and the movement of people and goods to the west coast, and the needs of newly settled groups of people in the northwest. Unfortunately, due to the history of San Francisco, the great fire of 1906 destroyed all documentation as to the final destination of the crate. Because of this, the analysis of its intended disposition is only a well researched guess.

The *Brother Jonathan* had a long and varied career for an ocean going steamboat. Most of her life revolved either directly or indirectly around the search for gold. Built and initially used on the east coast in 1850, she was purchased and rebuilt several times during her life. Her routes included transporting passengers to the east side of the Panama Isthmus, transporting passengers from the west side of the Nicaragua isthmus up to California, and several smaller routes in between. Her last route involved carrying goods and passengers from San Francisco north to the Oregon territory and into Canada at Vancouver Island. She was still in the business of working for the miners, as the rush for gold had moved into the northern territories. When she sank, she was weighted down with an ore crusher destined for a mine in Idaho.

The contents of the crate are an excellent tool to describe the richness of the "Hardware Capital of the World", New Britain, Connecticut. This town, founded by the men whose families are still in the tool and hardware business today, was the backbone of America's capitalism. Items that were traditionally made at home were mass produced in large factories. These men, with Cornelius Erwin and Henry Russell in the lead, created an empire. Most of these items from the crate were probably manufactured in 1864, prior to the publication of the Russell and Erwin Manufacturing Company's very large catalog. However, this invaluable tool contains listings for each object found in the crate except the plain leather belts. The listings and corresponding drawings are important for identification and comparison of each artifact type.

Prior to opening the crate, the contents were totally unknown. It quickly became apparent that it held a great deal of hardware, most likely not intended for one person. As the multiples of artifacts came to light, it was quickly reasoned that this must be a shipment for a hardware store, but even more likely, a general store. The contents of the crate were easily divided into four categories: architecture, tools, food and fur, and personal items. The majority of items fall into the architecture and tools categories.

There is a wide variety of architectural goods in the crate, mostly for finishing work. All of the items have to do with doors and windows. None of them are fancy or have any embellishment. However, several of the hardware implements are for fixtures that would not occur in a simple country home. The hardware for sliding or pocket doors and shutters leads one to believe that this crate may have been intended for a store that would have been located in a town of some size. As previously stated, the rest of the architectural hardware is plain; the doorknobs are a common brown agate-like ceramic, but Russell and Erwin Manufacturing Company sold, at that time, very intricate brass doorknobs.

The tools are mostly regular tools, something that would have been common in many homes in the wilderness or in a very small community. The axes, hatchets, and coal shovels were used in many households. The inclusion of the scythes indicates a farming community, while the plumb bobs reference a builder or surveyor. One of the more specific artifacts contained in the crate were the tap borers. This is a tool that is specific to the coopering trade. However, general store merchants and tavern owners would keep these for use in a store to tap a new barrel. It seems unlikely that the store owner would have purchased nine of them for his own use.

The food and fur items, while limited, are inline with most of the other items recovered from the crate. The traps for obtaining fur bearing animals would not have been used in a large city, such as Victoria. Trapping would have taken place in the wilderness or just outside small communities. The use and selling of fur was a major industry in the west and, perhaps, the owners of these new traps were trying to make some extra money to help support or feed their family. Food preparation was more basic in the northwest. The inclusion of the grinders indicates some meat and even possibly vegetable preparation. However, again, these do not indicate one specific area where the merchandise could have been headed.

The most telling artifacts are those that have the least amount of historical research available. The leather belts and knife sheaths were not items that were used often in middle and upper class dress. These were parts of the working uniform, used to assist in everyday projects.

With a careful eye on all the evidence, it seems most likely that the *Brother Jonathan* crate was intended for a small, but well established town with a base of customers from town as well as those that did not live directly in town. This could have been destined for any of the small settlements north of California. All the items contained in the crate could find a cliental in settled area. However, the architectural items and especially the pocket door hardware clearly indicates that it has to be a settlement developed enough or affluent enough to invest in and build these doors more commonly found in the more affluent households. Customers from the more rural or backwoods areas are just as likely to come to "town" or a port town to purchase basic necessities.

Most artifacts from the crate could be for any small town. However, with the telling artifacts of the sliding door sheaves and rails, the *Brother Jonathan* was known for taking supplies to Portland and Victoria, the two largest towns north of San Francisco. But she did make frequent stops along the coast to pick up passengers and drop off goods, such as the stop she made that fateful day in July in Crescent City. It is also likely that this could have been unloaded at Portland or Victoria and then continued its shipment into the country, like the ore crusher that was headed for Idaho. However, without the documentary evidence that was most likely destroyed in the fire of 1906, the true destination cannot be determined.

REFERENCES

United States Supreme Court
1998 *California and Sate Land Commission, Petitioners v. Deep Sea Research, Inc., Et Al.* (96-1400) 102 F. 3d 379. April 22, 1998.

Ball and Ball Antique Hardware Reproductions
2002 Lock History.
<http://www.ballandball-us.com/lockhistory.html>.

Bancroft, H. H.
1887 *History of British Columbia: 1792 - 1887*. The History Company, Publishers, San Francisco, CA.

Bancroft, H. H.
1890 *History of California: 1860 - 1890*. The History Company, Publishers, San Francisco, CA.

Barlow, Ronald S
2003 *300 Years of Farm Implements and Machinery: 1630-1930*. Krause Publishing, Iola, WI.

Barman, J
1996 *The West Beyond the West: A History of British Columbia*, Rev. University of Toronto Press, Buffalo, NY.

Bateman, James
1971 *Animal Traps and Trapping*. Stackpole Books, Harrisburg, PA.

Belyk, R.C.
2001 *Great Shipwrecks of the Pacific Coast*. John Wiley & Sons, Inc., New York City, NY.

Blackburn, Graham
1998 *Traditional Woodworking Handtools: A Maunual for the Woodworker*. The Lyons Press, New York City, NY.

Blackburn, Graham
2000 *The Illustrated Encyclopedia of Woodworking Handtools Instruments & Devices*, 3rd edition. Blackburn Books, Bearsville, NY.

Bowers, Q.D.
1999 *The Treasure Ship S.S. Brother Jonathan: Her Life and Loss, 1850 - 1865*. Bowers and Merena Galleries, Inc, Wolfeboro, NH.

Bridge, K.
1996 *Henry & Self: The Private Life of Sarah Crease, 1826 - 1922*. Sono Nis Press, Victoria, BC.

Brown, Travis
1994 *Historical First Patents: The First United States Patent for Many Everyday Things*. The Scarecrow Press, Inc., Netuchen, NJ.

Bucher, Ward, Ed.
1996. *Dictionary of Building Preservation*. John Wiley & Sons, Inc., New York City, NY.

Camp, David N.
1889 *History of New Britain with sketches of Farmington and Berlin, Connecticut. 1640 - 1889*. William B. Thomson & Company, New Britain, CT.

Carden, Maren Lockwood
1969 *Oneida: Utopian Community to Modern Corporation*. The Johns Hopkins Press, Baltimore, MD.

Cole, Jim
1999 Re: Pocket Doors: How do they work? So I can fix 'em. <http://antiquerestorers.com/_FURNITURE/0000013f.htm>.

Corbin, Annalies
2000 *The Material Culture of Steamboat Passengers: Archaeological Evidence from the Missouri River*. Plunum Publishers, New York City, NY.

Cummings, M.F.
1873 *Cummings' Architectural Details, Containing 387 Designs and 967 Illustrations of the Various Parts Needed in the Construction of Buildings, Public and Private, Both for the City and the Country. Also Plans and Elevations of Houses Stores, Cottages, and Other Buildings.* Orange Judd & Co., New York City, NY. Reprinted 1978 by The American LIfe Foundation & Study Institute, Watkins Glenn, NY. *Victorian Archeitecutral Details: Two Pattern Books by Marcus Fayette Cummings and Charles Crosby Miller*.

Daily Alta
1865a Consignees. *Daily Alta* 4 Aug: 4. San Francisco, CA.

Daily Alta
1865b Consignees'. *Daily Alta* 24 July: 4. San Francisco, CA.

Daily Alta
1865c Exports. *Daily Alta* 29 July: 4. San Francisco, CA.

Daily Alta
1865d For Portland and Victoria. *Daily Alta* 22 July: 2. San Francisco, CA.

Delgado, J. P.
1985. "Great Leviathan of the Pacific" The Saga of the Gold Rush Steamship *Tennessee*. Ph. D. Dissertation, History, East Carolina University, Greenville, NC.

Delgado, J. P.
1990 *To California by Sea: A Maritime History of the California Gold Rush*. University of South Carolina Press, Columbia, SC.

Delgado, J. P.
1995 Nomination of the *Brother Jonathan* - Shipwreck Site to the National Register of Historic Places. National Park Service, United States Department of the Interior.

Delgado, J. P.
1997a Arabia. In *Encyclopedia of Underwater and Maritime Archaeology* J. P. Delgado, editor, pp. 32. Yale University Press, New Haven, CT.

Delgado, J. P.
1997b Niantic. In *Encyclopedia of Underwater and Maritime Archaeology* J. P. Delgado, editor, pp. 297. Yale University Press, New Haven, CT.

Delgado, J. P.
1997c Steamboat Archaeology in North America. In *Encyclopedia of Underwater and Maritime Archaeology* J. P. Delgado, editor, pp. 402-403. Yale University Press, New Haven, CT.

Dunbar, Michael
1988 Old House Myths. *Early American Life,* 19(2): 28-31.

Eastlund, John R.
2004 George Bass Dives for His Own Past. *The INA Quarterly,* 31(4): 14-17.

Eastwood, Maude
2002 Plain and Variegated Mineral Knobs and Their Extended Family (What You Don't See is What You Got). *The Doorknob Collector*(Nov - Dec).

Folkman, Jr., D. I.
1972 *The Nicaragua Route*. University of Utah Press, Salt Lake City, UT.

Foster, Lawrence, Ed.
2001. *Free Love in Utopia: John Humphrey Noyes and the Origin of the Oneida Community*. University of Illinois Press, Urbana, IL.

Fowler, Herbert E
1960 *A History of New Britain*. New Britain Historical Society, New Britain, CT.

Gardiner, R, Ed.
1993a. *The Advent of Steam: The Merchant Steamship Before 1900*. Conway's History of the Ship. Conway Maritime Press, London.

Gardiner, R, Ed.
1993b. *Sail's Last Century: The Merchant Sailing Ship 1830 - 1930*. Conway's History of the Ship. Conway Maritime Press, London.

Gerstell, Richard
1985 *The Steel Trap in North America: The Illustrated Story of its Design, Production, and Use with Furbearing and Predatory Animals, from its Colorful Past to the Present Controversy*. Stackpole Books, Harrisburg, PA.

Gibbs, J
1986 *Peril at Sea: A Photographic Study of Shipwrecks in the Pacific*. Schiffer Publishing, Ltd., Westchester, PA.

Gilberg, Mark R. and Nigel J. Seeley
1982 The Alkaline Sodium Sulfite Reduction Process for Archaeological Iron: A Closer Look. *Studies in Conservation,* 27(4): 180-184.

Glazebrook, G. P. de T.
1938 *A History of Transpotation in Canada*. Yale University Press, New Haven, CT.

Gould, R. A.
2000 *Archaeology and the Social History of Ships*. Cambridge University Press, London.

Great Lakes Historical Society
1912 Sheaves for State Room Sliding Doors, *SeeandBee* Str. No. 190. Ship Plans Collection, Great Lakes Historical Society, Vermilion, OH.

Hale, Albert W.
1859 *Meat Mincer*. United States Patent 23246, granted March 15, 1859. United State Patent Office, Washington, DC.

Hale, Albert W.
1865 *Meat-Mincer*. United States Patent Reissue 2136, granted December 26, 1865. United States Patent Office, Washington, DC.

Hamilton, Donny L.
1996 *Basic Methods of Conserving Underwater Archaeological Material Culture*. U.S. Department of Defense Legacy Resource Management Program, Washington, DC.

Hammon, Neil O.
1994 The First Reversible Rim Lock and Some Contemporaries. *Association for Perservation Technology Bulletin*, 25(3-4): 56-59.

Hammon, Neil O.
1997 Reversible Latch Rim Locks: Late Nineteenth-Century Popular Hardware. *Association for Perservation Technology Bulletin*, 28(2-3): 34-36.

Harmon, J.S.
1979 Recovering the Steamboat *Bertrand*. *Early Man*(Autumn): 10-12.

Hawley, David
1995 *Treasures of the Steamboat Arabia*. *Arabia* Steamboat Museum, Kansas City, MO.

Heavrin, Charles A.
1998 *The Axe and Man: The History of Man's Early Technology as Exemplified by His Axe*. The Astragal Press, Mendham, NJ.

Hennessy, Thomas F.
1976 *Early Locks and Lockmakers of America*. Nickerson & Collins Publishing Co., Des Plaines, IL.

Hurt, R. Douglas
1994 *American Agriculture: A Brief History*. Iowa State University Press, Ames, IA.

Jayne, Thomas
1996 American Victorian (1840-1910). In *The Elements of Style: A Practical Encyclopedia of Interior Architectural Details from 1485 to the Present* S. Calloway, editor, pp. 272-305. Simon & Schuster, New York City, NY.

Jones, Carol
2002 *From Farm to You: Sausage*. Chelsea House Publishers, Philadelphia, PA.

Kauffman, Sandra
1980 *The Cowboy Catalog*. Clarkson N. Potter, Inc., New York City, NY.

Kean, Herbert P. and Emil S. Pollack
1990 *Collecting Antique Tools*. The Astragal Press, Mendham, NJ.

Kemble, J.H.
1990 *The Panama Route, 1848-1869*. University of South Carolina Press, Columbia, SC.

Klaw, Spencer
1993 *Without Sin: The Life and Death of the Oneida Community*. Allen Lane - The Penguin Press, New York City, NY.

Larkin, F.D.
1988 Cornelius Vanderbilt. In *Encyclopedia of American Business History and Biography: Railroads in the Ninetheenth Century* R. L. Frey, editor, pp. 398-408. Facts on File, New York City, NY.

Larson, Kenneth A.
1975 *A Walk Around Walnut Hill, New Britain, Connecticut: an architectural and historical survey in photographs, drawings, maps, and text of the buildings and sites in the area surrounding Walnut Hill Park, New Britain, Connecticut, 1830-1930*. THe Art Press, Inc., New Britain, CT.

Laver, James
2002 *Costume and Fashion: A Concise History*, 4th. Thames & Hudson, New York City, NY.

Lipps, John Philip
1858 *Latch*. United States Patent 20850, granted July 6, 1858. United States Patent Office, Washington, DC.

Madsen, H. Brinch
1967 A Preliminary Note on the Use of Benzotriazole for Stabilizing Bronze Objects. *Studies in Conservation*, 12(4): 163-167.

Madsen, H. Brinch
1971 Further Remarks on the Use of Benzotriazole for Stabilizing Bronze Objects. *Studies in Conservation*, 16(3): 120-122.

McIntosh, Elaine N.
1995 *American Food Habits in Historical Perspective*. Praeger, Westport, CT.

McKerrell, H., E. Roger and A. Varsanyi
1972 The Acetone/Rosin Method for the Conservation of Waterlogged Wood. *Studies in Conservation*, 17: 111-125.

Nelson, Lee H.
1980 Introduction. In *Illustrated Catalogue of American Hardware of the Russell and Erwin Manufacturing Company*, pp. iii-xi. Association for Preservation Technology, Lisle, IL.

New Britain Daily News
1900 *New Britain Daily News* September 19, 1900. New Britain, CT.

New Britain Record
1866 New Britain Manufactures - No.1. *New Britain Record* 6 April. New Britain, CT.

O'Hara, Georgina
1986 *The Encyclopedia of Fashion*. Harry N. Abrams, Inc, New York City, NY.

Olive, J and C Pearson
1975. The conservation of ceramics from archaeological sources. Proceedings of the International Institute for Conservation of Historic and Artistic Works, pp. 63-68. *Conservation in Archaeology and the Applied Arts*. London.

Pacella, Gerard
2002 *100 Legendary Knives*. Krause Publications, Iola, WI.

Peacock, John
1996 *Men's Fashion: The Complete Source Book*. Thames and Hudson, London.

Pepper, John Paige
1851 *Improvement in Mineral Composition Resembling Jasper*. United States Patent 8,592, granted December 16, 1851. United States Patent Office, Washington, DC.

Perrault, Carole L.
1976 Researching 19th-Century American Patents: The Journal of the Franklin Institute. *Association for Perservation Technology Bulletin*, VIII(2): 24-70.

Petsche, J.E.
1974 *The Steamboat Bertrand: History Excavation and Architecture*. National Park Service, U.S. Department of the Interior, Washington, DC.

Priess, Peter J.
1979 *A Study of Surface-Mounted Door Locks From a Number of Archaeological Sites in Canada*. National Historic Parks and Sites Branch, Parks Canada
Indian and Northern Affairs Canada,

R2 Underwater Consultants
1997 Report of Field Activities on the S.S. *Brother Jonathan* Submerged Cultural Resrouce Site Crescent City, California 18-31 August, 1997. United States District Court for the Northern District of California.

Rowland, K.T.
1970 *Steam at Sea: A History of Steam Navigation*. Praeger Publishers, New York City, NY.

Russell and Erwin Manufacturing Company
1851 Records of the organization, Bylaws and proceedings of the Russell and Erwin Manufacturing Company of New Britain Connecticut, Private Collection of Tom Hennessy, Lock Museum of America, Terryville, CT.

Russell and Erwin Manufacturing Company
1864 Stock Expansion and Agreement by Buyers, Private Collection of Tom Hennessy, Lock Museum of America, Terryville, CT.

Russell and Erwin Manufacturing Company
1865 *Illustrated Catalogue of American Hardware of the Russell and Erwin Manufacturing Company*. Russell and Erwin Manufacturing Company, New Britain, CT. Reprinted 1980 by Association for Preservation Technology, Lisle, IL.

Salaman, R.A.
1990 *Dictionary of Woodworking Tools c. 1700-1970*. Taunton Press, Newton, CT.

Schremp, Gerry
1996 *Celebration of American Food: Four Centuries in the Melting Pot*. Fulcrum Publishing, Golden, CO.

Seale, William
1981 *The Tasteful Interlude*, 2nd. American Association for State and Local History, Nashville, TN.

Sloane, Eric
1973 *A Muesum of Early American Tools*. Ballantine Books, New York City, NY.

Sloper, William Thomson
1949 *The Life and Times of Andrew Jackson Sloper, 1849 - 1933*. Not listed, United States (city not listed).

Smith, C. Wayne
2003 *Archaeological Conservation Using Polymers: Practical Applications for Organic Artifact Stabilization*. Texas A&M University Press, College Station, TX.

Thibodeau, Patrick
1989 *New Britain: The City of Invention: An Illustrated History*. Windsor Publications, Inc., Chatsworth, CA.

Travellog
1997 History of Locks and Keys. <http://queensnewyork.com/history/locks.htm>.

United States Patent Office
1976 *Revolutionary Ideas - Patents & Progress in America*. United States Government Printing Office, Washington, DC.

United States Supreme Court
1998 *California and Sate Land Commission, Petitioners v. Deep Sea Research, Inc., Et Al.* (96-1400) 102 F. 3d 379. April 22, 1998.

Van Slyck, J.D.
1879 Russell and Erwin Mfg. Co. In *New England Manufacturers and Manufactories*, Vol. II, pp. 517-522. Van Slyck and Company, Boston, MA.

Vince, John
1982 *Old Farms: An Illustrated Guide*. Bramhall House, New York City, NY.

Walker, G.K.
1999 "We'll Find a New Captain..." The *Brother Jonathan* Shipwreck Exhibit. <http://shipwrecks.slc.ca.gov/Brother_Jonathan/Ships_History.htm>.

West, Michael
2002. The Paleoethnobotany of the *Brother Jonathan* Crate, July 1865. ANTH 637:Paleoethnobotany research paper, Department of Anthropology, Texas A&M University, College Station, TX.

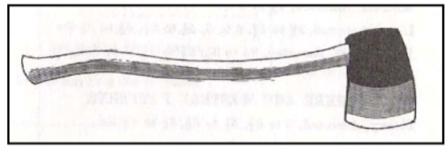
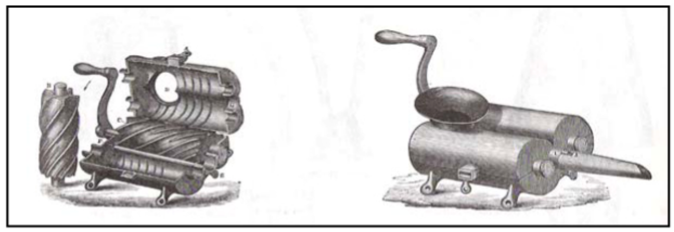
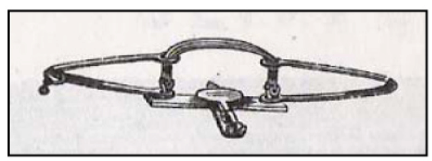
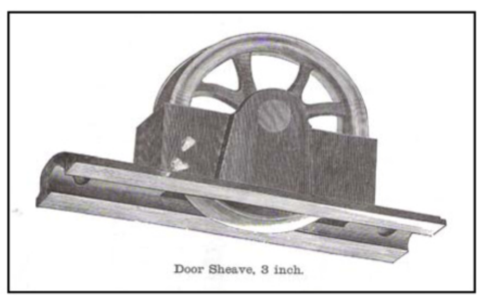
White, Marcus
1903 *New Britain, The Center of Hardware Manufacture: Containing a brief review of its wonderful industrial development*. P.&F. Corbin, Russell & Erwin Mfg. Co., The Stanley Works, Landers, Frary & Clark, Stanley Rule & Level Co., Corbin Screw Corporation, Corbin Cabinet Lock Co., New Britain, CT.

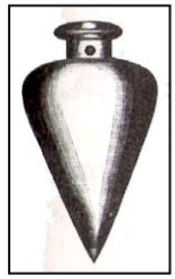
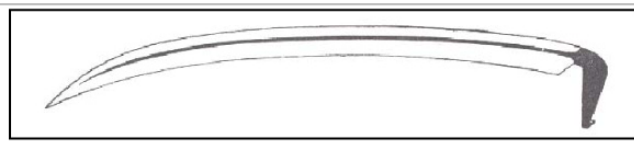
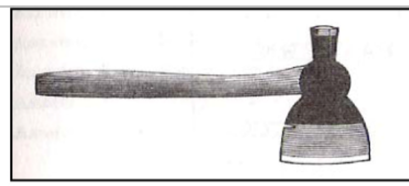
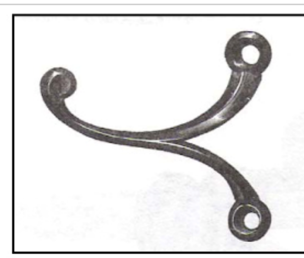
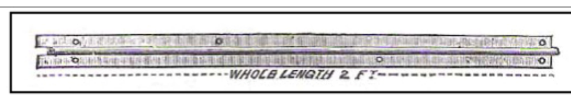
Wyatt, Robin
1996 British Victorian (1837-1901). In *The Elements of Style: A Practical Encyclopedia of Interior Architectural Details from 1485 to the Present* S. Calloway, editor, pp. 232-271. Simon & Schuster, New York City, NY.

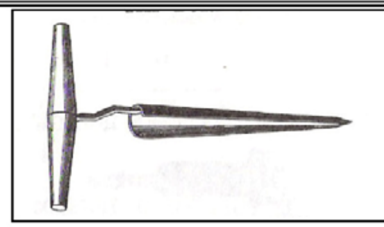
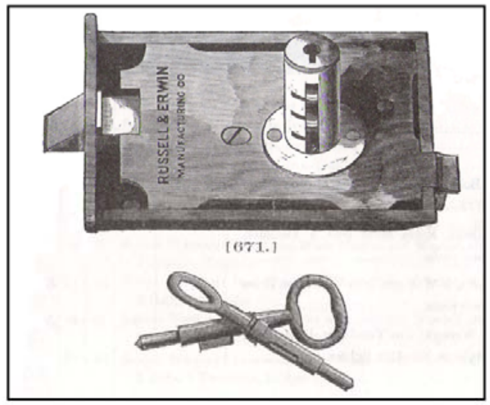
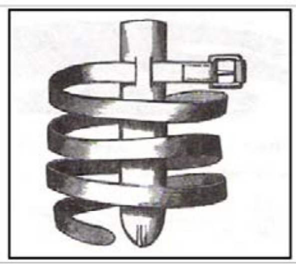
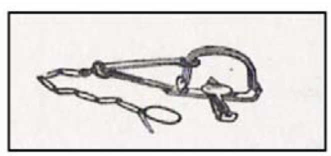
YSG Door Security Consultants
2006 A History of YSG Brands.
<http://www.ysgsecurity.com/company/history/index.cfm>.

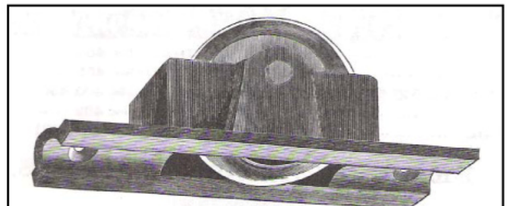
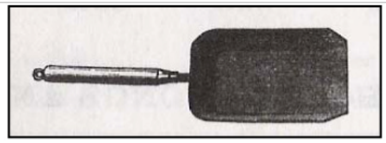
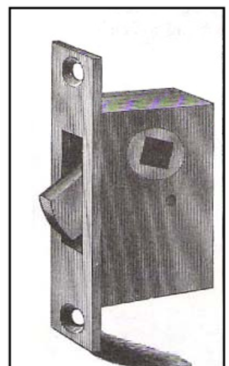
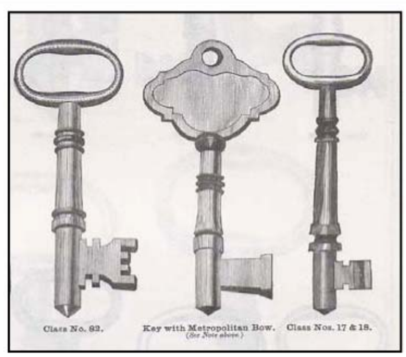
APPENDIX A

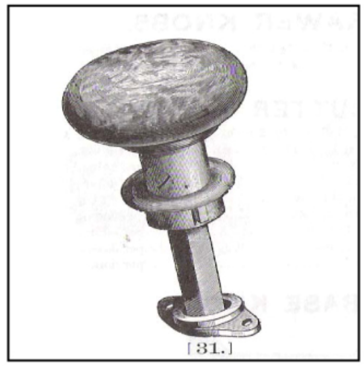
ARTIFACT LIST WITH CATALOG ILLUSTRATIONS

Number	Artifact	Illustration
BJ-17-01	Wood from box	
BJ-17-02	Tin, solder, molds	
BJ-17-03	Lead shot	Came on top of box
BJ-17-04	Not in Use	
BJ-17-05	Axe package	
BJ-17-06	Axe package	#2 (See BJ-17-05)
BJ-17-07	Fibers	Under grinders
BJ-17-08	Glass - medicine bottle	Outside crate
BJ-17-09	Large Meat grinder	
BJ-17-10	Wood shavings	Packing material
BJ-17-11	Pine needles	Packing material
BJ-17-12	Unidentified molds	Nothing
BJ-17-13	Not in Use	
BJ-17-14	Grinder Crank	See BJ-17-09
BJ-17-15	Grinder Crank	See BJ-17-09
BJ-17-16	Not in Use	
BJ-17-17	Concretion	No artifacts
BJ-17-18	Flat base of traps	
BJ-17-19	Not in Use	
BJ-17-20	Large Sheave Package	
BJ-17-21	Large Sheave Package	See BJ-17-20
BJ-17-22	Large Sheave Package	See BJ-17-20
BJ-17-23	Not in Use	

Number	Artifact	Illustration
BJ-17-24	Plumb bob package	
BJ-17-25	Large Meat Grinder	See BJ-17-09
BJ-17-26	Small Meat Grinder	See BJ-17-09
BJ-17-27	Small Meat Grinder	See BJ-17-09
BJ-17-28	Scythe package	
BJ-17-29	Scythe package	See BJ-17-28
BJ-17-30	Large Sheave Package	See BJ-17-20
BJ-17-31	Large Sheave Package	See BJ-17-20
BJ-17-32	Large Sheave Package	See BJ-17-20
BJ-17-33	Hatchet package	
BJ-17-34	Not in Use	
BJ-17-35	Not in Use	
BJ-17-36	Half ring	See BJ-17-18
BJ-17-37	Hook package	
BJ-17-38	Trap Chain	See BJ-17-18
BJ-17-39	mold	Similar to BJ-17-18
BJ-17-40	Not in Use	
BJ-17-41	Door rails	
BJ-17-42	Hook package	See BJ-17-37

Number	Artifact	Illustration
BJ-17-43	Auger handle	
BJ-17-44	Hook package	See BJ-17-37
BJ-17-45	Door lock package	
BJ-17-46	Hook package	See BJ-17-37
BJ-17-47	Blue glass bead	Outside crate
BJ-17-48	Leather sheaths	
BJ-17-49	Fibers	In packing matrix
BJ-17-50	Iron ring	See BJ-17-18
BJ-17-51	Dog and pan for trap	
BJ-17-52	String	Around BJ-17-56
BJ-17-53	String	Around trap base (BJ-17-18)
BJ-17-54	Glass - pane	Outside crate
BJ-17-55	Ring	See BJ-17-18 and BJ-17-51
BJ-17-56	Jaws for trap	See BJ-17-18 and BJ-17-51
BJ-17-57	Long springs	See BJ-17-18 and BJ-17-51
BJ-17-58	Glass - hurricane	Outside crate
BJ-17-59	Hook package	See BJ-17-37

Number	Artifact	Illustration
BJ-17-60	Auger handle	See BJ-17-43
BJ-17-61	Auger handle	See BJ-17-43
BJ-17-62	Hatchet package	See BJ-17-33
BJ-17-63	Auger handle	See BJ-17-43
BJ-17-64	Hook package	See BJ-17-37
BJ-17-65	Medium pulley package	 Sliding Shutter Sheave, $1\frac{3}{4}$ inch.
BJ-17-66	Hook package	See BJ-17-37
BJ-17-67	Shovels	
BJ-17-68	Window locks	 [59.]
BJ-17-69	Window locks	See BJ-17-69
BJ-17-70	Keys package	
BJ-17-71	Auger handle	See BJ-17-43

Number	Artifact	Illustration
BJ-17-72	Hook package	See BJ-17-37
BJ-17-73	Medium pulley package	See BJ-17-65
BJ-17-74	Door knob package	
BJ-17-75	Door knob package	See BJ-17-74
BJ-17-76	Tap borer package	See BJ-17-43
BJ-17-77	Auger handle	See BJ-17-43
BJ-17-78	Auger handle	See BJ-17-43
BJ-17-79	Auger handle	See BJ-17-43
BJ-17-80	Auger handle	See BJ-17-43
BJ-17-81	Glass - hurricane	Outside crate
BJ-17-82	Small pulley package	See BJ-17-65
BJ-17-83	Leather belts	No illustration in Catalog
BJ-17-84	Bird shot	Outside crate
BJ-17-85	Medium pulley package	See BJ-17-65
BJ-17-86	Ring	See BJ-17-18 and BJ-17-52
BJ-18-87	Copper nail	Outside crate
BJ-17-88	Unknown mold	
BJ-18-89	Ring	See BJ-17-18 and BJ-17-52
BJ-17-90	Auger package	See BJ-17-43
BJ-17-91	Auger package	See BJ-17-43
BJ-17-92	Door knob package	See BJ-17-74
BJ-17-93	Shovels	See BJ-17-67
BJ-17-94	Ring	See BJ-17-18 and BJ-17-52
BJ-17-95	Grinder Cranks	See BJ-17-09

All illustrations (Russell and Erwin Manufacturing Company 1865)

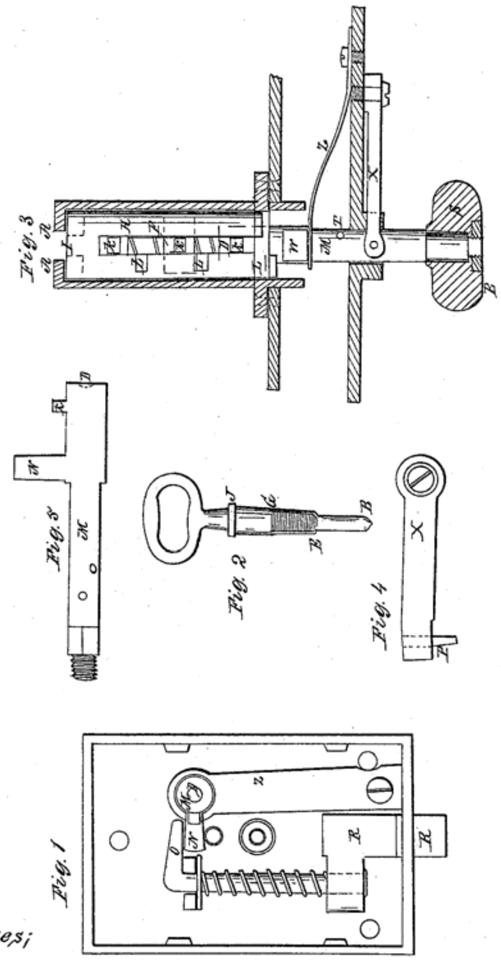
APPENDIX B

LIPPS LOCK PATENT #20,850

J. P. Lipps,

Latch.

No. 20,850. Patented July 6, 1858.



Witnesses;

Geo. D. Baldwin

C. W. Dickinson

Inventor;

John Philip Lipps

[redacted]

UNITED STATES PATENT OFFICE.

J. P. LIPPS, OF NEWARK, NEW JERSEY, ASSIGNOR TO GEO. D. BALDWIN, OF NEW YORK, N. Y.

LOCK.

Specification of Letters Patent No. 20,850, dated July 6, 1858.

To all whom it may concern:

Be it known that I, J. Philip Lipps, of the city of Newark, county of Essex, State of New Jersey, have invented a new and useful Improvement in the Construction of Locks for Doors, Gates, and other Places Requiring Security, of which the following description, illustrated by the accompanying drawings and references, is deemed sufficiently clear and distinct to enable others of competent skill to make and use my improvement.

The nature of the improvement consists in an independent bit, held front or above its working place, by a horizontal spring Z, thereby securing against the insertion of any instrument with a view to pick the lock. There is also a hook on the hind part of the lock, by which the independent bit may be fastened rendering it impossible to unlock the door from the front even with the real key.

Figure 1 is the lock from the front, with the front plate taken off, showing the internal arrangement of the bolt, horizontal spring, the independent bit, &c. Fig. 2, is the key. Fig. 3, is a somewhat extended or enlarged sectional view of the lock, showing the arrangement for the action of the key and knob or handle, and the position of the hook, or night latch. Fig. 4, is the hook or night latch. Fig. 5, is the independent bit.

The operation is as follows, on inserting the key at A, Fig. 3, the end of the key B, Fig. 2, strikes the end of the independent bit M, at D Figs. 3, and 5, and the shoulder of the key E, Fig. 2 strikes the sliding piece of metal F, Fig. 3. The shoulder of the key G, Fig. 2, strikes against the barrel at I, Fig. 3, and as the key is forced into the lock, the independent bit M, the sliding piece F, and the inner barrel H, are forced back until the shoulder J, Fig. 2 of the key, strikes the bearing A, Fig. 3. This operation places the pawls or guard K, K, K, Fig. 3, opposite the notches L, L, L, and on turning the key toward the notches L, L, L, the independent bit M, will be turned in the same direction, and by the action of the pawl N against the bolt connections O, Fig. 1, the bolt R, Fig. 1, is withdrawn thus releasing or unfastening the door or gate.

Fig. 4, represents a hook or night catch (which is also shown at X Fig. 3,) so placed that when forced down the pin P, Fig. 4, enters a hole in the independent bit M, under P, Fig. 3, thereby securely fastening the same, thus preventing the bolt R from being drawn back by any person from the outside, or by drawing the independent bit back by the knob S, the hole T, Fig. 3, may be brought under the pin P, and held by the pin, thus keeping the bolt R, within the lock.

What I claim is—

The independent bit M constructed as shown and held anteriorly or above the bolt by the horizontal spring Z, (and independent of the spiral springs) thereby securing against the introduction of any instrument to pick the lock.

JOHN PHILIP LIPPS.

Witnesses:
Geo. D. Baldwin,
C. W. Dickinson.

[redacted]

APPENDIX C

PEPPER FAUX JASPER PATENT #8,592

UNITED STATES PATENT OFFICE.

JOHN PAIGE PEPPER, OF NEW BRITAIN, CONNECTICUT.

IMPROVEMENT IN MINERAL COMPOSITION RESEMBLING JASPER.

Specification forming part of Letters Patent No. **8,592**, dated December 16, 1851.

To all whom it may concern:

Be it known that I, JOHN PAIGE PEPPER, of New Britain, in the county of Hartford and State of Connecticut, formerly of Albany, in the State of New York, have invented a new and useful Mineral Composition, which I call "Argillo-Stone," capable of being manufactured into various articles of utility and ornament, and possessing the following external characters, to wit: variegated colors distributed into clouds, spots, and figures, approaching the aspects of jasper, plain jaspery colors sometimes being produced without variegations, a vitreous luster, and breaking into sharp translucent edges and conchoidal opaque surfaces; and I do hereby declare that the following is a full and exact description of the materials of the said composition, and of the process of making the same, as invented by me.

This composition is made by the fusion of clay with alkaline matter and coloring substances. The clay employed is a silicate of alumina mixed with lime and oxide of iron. This material, having been first thoroughly dried and pulverized, is mixed with alkali soda and lime in the proportions of one hundred pounds of clay, thirty pounds of soda-ash, and ten pounds of slaked lime. These proportions may be somewhat varied without substantially varying the result, and other alkalies may be substituted for the alkali soda; but I prefer that alkali and the above-stated proportions of materials. The mixture thus made, which constitutes the batch of the composition, is fused and vitrified in glass-house pots, employing for this purpose a glass-house furnace running with ordinary heat. The processes are then continued as follows: sulphate of copper or blue vitriol, in the proportion of one pound of the vitriol to two hundred pounds of the batch, is thrown into the pots containing the melted material, and, becoming disseminated through the metal, produces the variegation of color which characterizes the jasper-stone.

The proportion of the sulphate of copper may be varied according as the colors are required to be more or less deep. Other forms of copper also may be used as substitutes for the sulphate to produce these effects; but the latter is the most available and convenient.

The metal thus produced is worked into various articles of utility and ornament by well-known mechanical processes and the annealing operations familiar to workers in vitreous metal.

What I claim as my invention, and desire to secure by Letters Patent, is—

The manufacture of a mineral composition, having the external characters above described, by the fusion of clay with alkali soda, lime, and sulphate of copper, as above described, or their equivalents, and working the composition into articles of utility and ornament in the manner above described.

JOHN PAIGE PEPPER.

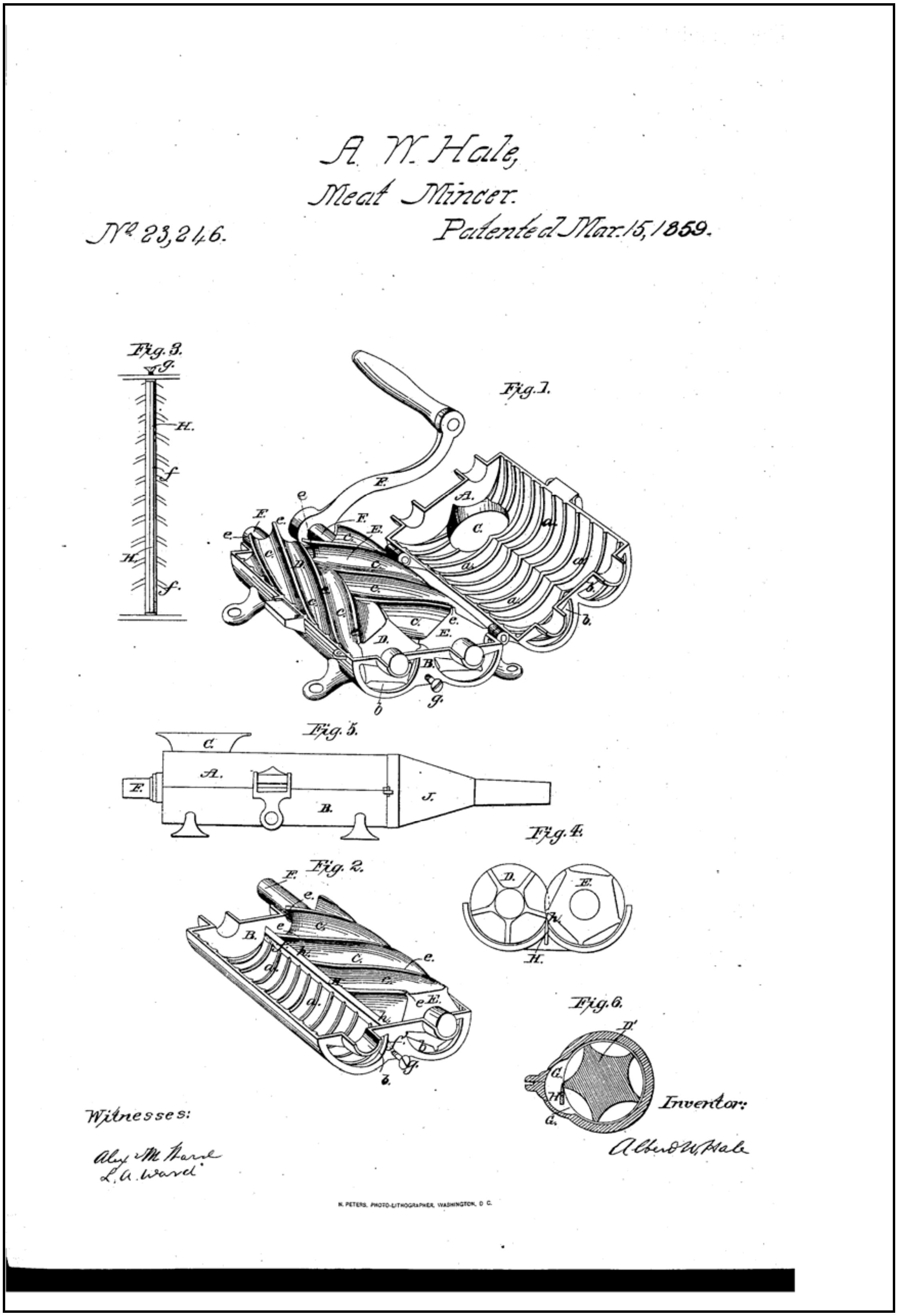
Witnesses:

F. S. MYER,

H. E. RUSSELL.

APPENDIX D

HALE MEAT MINCER PATENTS #23,246 AND #RE2,136


A. W. Hale,
Meat Mincer.
No. 23,246.
Patented Mar. 15, 1859.
Fig. 3.
Fig. 1.
Fig. 5.
Fig. 4.
Fig. 2.
Fig. 6.
Witnesses:
Inventor:
N. PETERS, PHOTO-LITHOGRAPHER, WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

ALBERT W. HALE, OF NEW BRITAIN, CONNECTICUT.

MEAT-MINCER.

Specification forming part of Letters Patent No. 23,246, dated March 15, 1859; Reissued December 26, 1865, No. 2,136.

To all whom it may concern:

Be it known that I, Albert W. Hale, of New Britain, State of Connecticut, have invented a new and Improved Machine for Cutting or Mincing Meat, Vegetables, &c.; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings and to the letters of reference marked thereon and making a part of this specification.

The nature of my invention consists generally in the arrangement and use of one or more grooved cylinders or rollers, revolving in a grooved or ribbed case, and acting against a stationary knife, whereby I produce a machine economical and simple in construction; not liable to get out of order, and which can be easily kept sweet and clean for use.

Figure 1, is a perspective view, the upper case being removed or open, showing the construction of the case, the position of the grooved cylinders or rollers and also the place of discharge of the minced article. Fig. 2, is a view of the lower case, one cylinder being removed, showing the position of the knife, and also the construction of the lower case, or cylinder bed. Fig. 3, is a view of that portion of the lower case, holding the knife. Fig. 4, is an end view of the cylinders and knife in position; one cylinder being changed end for end, so as to show both the greatest and shallowest depths of the grooves. Fig. 5, is a side view of the machine with a stuffer attached. Fig. 6, is a sectional view of a machine with a single cylinder, instead of two.

The upper and lower cases A, and B, are constructed or fitted with ribs or projections *a*, *a*, Figs. 1, 2, upon their inner concave surfaces, which form, when the cases are in position or closed, a continuous spiral rib or screw, inclining forward and toward the orifices *b*, *b*, at which the minced article is discharged. These ribs *a*, *a*, may have any angle or inclination, more or less, as preferred, and as desired to have the meat, &c., pass slower or faster through the machine, but I generally prefer to give them such an inclination, that in passing once around, they shall have advanced a distance about equal to the diameter of the feeding orifice C, in order that anything fed into the machine would naturally, in a single revolution, pass beyond the orifice C.

The cylinders or rollers D, and E, are of such a size as very nearly to fill the space between the cases A, and B, when closed, and so as to prevent the passing of anything of much size or bulk between the case, and the rollers. These cylinders have also a number of spiral grooves *c*, *c*, running lengthwise, the spiral course of which may be greater or less as desired or found most convenient. The drawings represent five such grooves upon each cylinder, but the number is merely arbitrary, and may be varied, as desired. These grooves are also not of uniform size, but vary in depths as seen in Figs. 1, 4, their depth at one, or as it may be called the front end, being about equal to the distance from the shaft or axle F, to the periphery of the cylinder, and thence gradually diminishing toward the other end, until the bottom of the groove nearly reaches the periphery of the cylinder, as seen in Fig. 4, its distance here being more or less as it may be desired to have the thing cut coarser or finer, as from these ends of the grooves everything is discharged from the machine, and nothing can pass out until cut small enough to pass through these diminished orifices. From this construction of the cylinders and their grooves, it is readily apparent that pieces of meat &c., while of a largish size are prevented from passing into the shallowest parts of the grooves, and are continually pressed backward, and carried by the revolution of the cylinders toward the knife or knives, hereafter mentioned, and will only be discharged from the machine, when cut fine enough to pass out of the apertures *b*, *b*, made by the shallowest ends of the grooves with the surrounding case. The diminishing of the area of the grooves or spaces between the flanges of the cylinders D, and E, may also be effected by decreasing the diameters of such cylinders at one end, thus giving them the form of a frustum of a cone; and in such cases making the outer cases to fit to such form; and also in other ways. The particular form and arrangement of the parts is not material so long as this feature of diminishing the sectional area of the grooves, or spaces between the flanges, is substantially preserved. The number of grooves and flanges may also be greater at one end of the cylinder than at other, and the flanges may have a variable twist. The flanges or highest parts of such grooves, make at the periphery of such cylinder's edges *e*, *e*, which act against the knives referred to, with a drawing or shearing cut.

The position of the cylinders D, and E, in the cases A, and B, is such that the flanges or edges *e*, *e*, will lap a little upon each other, as shown in Figs. 1 and 4, so that the cylinder operated by the crank F^1, will communicate motion to the other without gearing, and thus cause both cylinders to revolve toward the knives placed between them as hereafter described, carrying with them by means of the grooves *c*, *c*, the article to be cut, and which the depth of the grooves, as before set forth, prevents from passing forward, and out of the orifice *b*, *b*, until it is sufficiently cut and minced. Instead however of constructing the cylinders with grooves as described, a shaft or axle may have flanges radiating from it, or placed tangentially upon it, which shall act upon the knife H, in the same way, as the edges *c*, *c*, the spaces between such flanges being so filled, or the depth of the flanges being so diminished, as substantially to secure the taper of the groove above referred to. Nor is the spiral direction of the grooves or edges, as above described, absolutely essential, as their arrangement may be varied by making the flanges of the revolving cylinder parallel to its axis, and inclining the edge of the knife, and so adjusting the cylinders, as to preserve and secure the benefits and advantages of the shearing cut of such edges on the knife, as described.

The position of the knife or knives H is shown in Fig. 2, and also an end view in Fig. 4. They extend the length of the cylinders, and rest in a slot or recess in the lower or under case B, directly between the cylinders—shown in Fig. 3, and are of such a height that the edge *h*, will be at that point or line where the grooved cylinders leave each other. As these cylinders revolve therefore, their flanges *e*, *e*, will be constantly acting upon the edge of the knife, with a drawing or shear cut, thus acting most easily and effectually.

The slot or recess in which the knife or knives rest may be a little tapering on one side, so as to allow the insertion of a small wedge *f*, Fig. 3, to fasten the knife; or such slot may be of uniform width and broader, with tapering wedges placed on each side of the knife, operated by screws at either end, so that the position of the knife may be adjusted as desired; or such slot may have a width uniform and a little greater than the thickness of the knife, so that the knife may rest in it loosely, its edge being kept in position by contact with the cylinders.

In order to give the edge of the knife the proper position, in respect to the cylinders D, and E, the ends of the back of the blade are beveled or chamfered, as shown by the dotted lines *f′*, *f′*, Fig. 2, against which work screws *g*, *g*, to elevate the knife, as necessary; or the blade may rest upon a small steel or other spring underneath it, or on a strip of rubber or other elastic material, or upon a wedge operated from either end to insure the contact of the edge. The same principle of operation may be secured by the use of a single revolving cylinder, though of course the capacity of the machine will be somewhat less. Such an arrangement is shown in Fig. 6. In such case the ribbed cases, and grooved and flanged cylinder will be the same as above described, but the knife H, will stand at one side of the cylinder D′, and will be supported at its ends, and perhaps at its middle, and the article cut will pass outside of the knife, into a cavity or recess G, cast at one side of the cases for such purpose, and from thence under the knife, and again in contact with the cylinder D′, and by it be again carried to the knife. A more rapid operation may be obtained by placing a knife on each side of such cylinder.

By attaching a funnel or stuffer J, as shown in Fig. 5, to the machine, casings of any kind can be filled at the same time the meat is minced. Without the stuffer, the machine is fitted for the ordinary uses of cutting and mincing.

The several parts of the machine may be cast, and are at once fit for use, except that the knife may be better rolled out the desired shape, and tempered or hardened; and the cylinders may be cast, rolled, or forged. The whole is simple in construction, not liable to get out of order, and every part is easily cleaned and kept sweet for use.

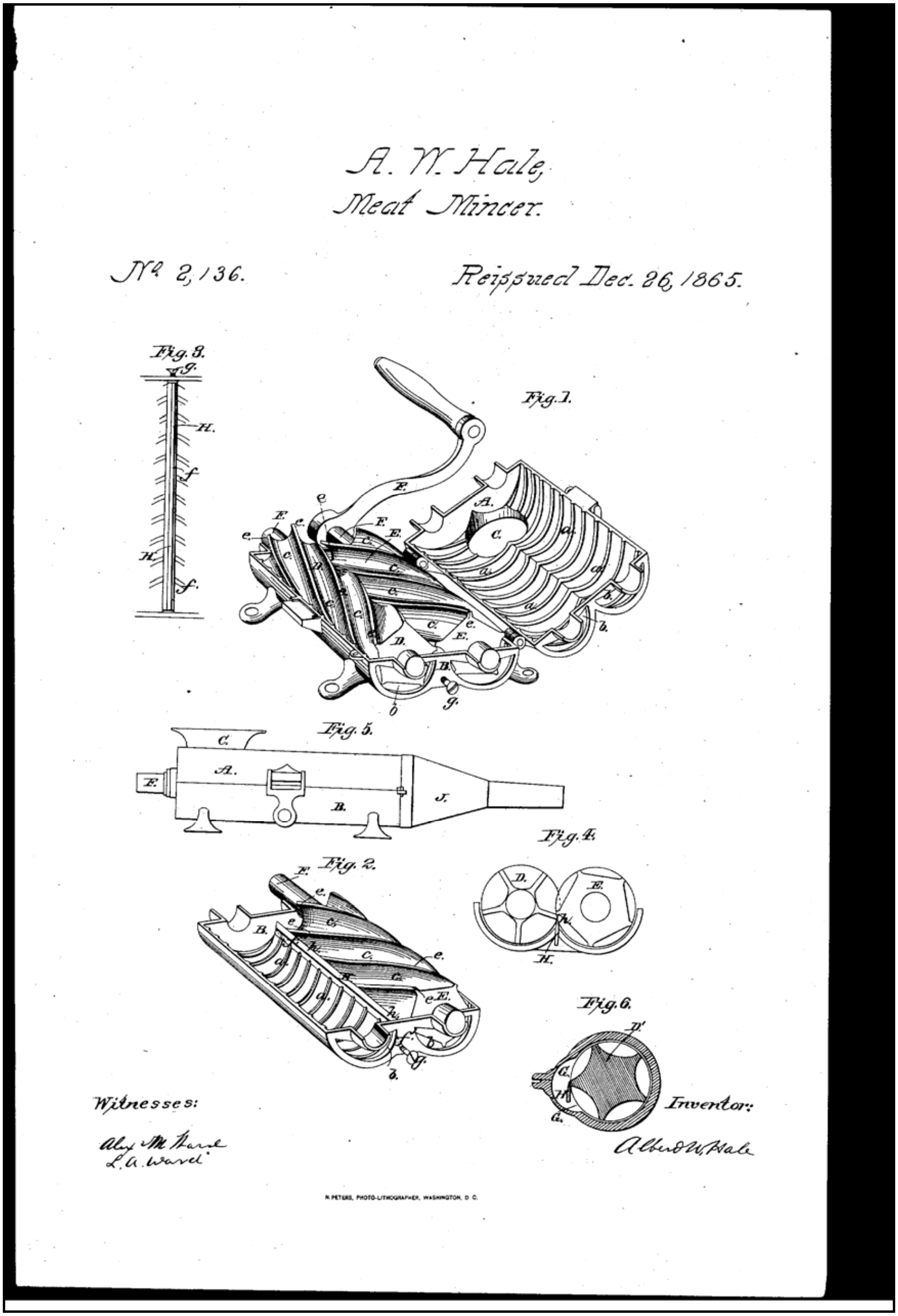
What I claim as my invention and desire to secure by Letters Patent is—

A cutting or mincing machine operating by means of a cylinder or cylinders having tapering grooves extending from end to end, in combination with, and revolving in fluted or ribbed cases A, and B, and acting against a stationary knife or knives placed in a plane parallel with the axes of the cylinders, the whole arranged substantially as and for the purposes set forth.

ALBERT W. HALE.

Witnesses:
ALEX. M. WARD,
L. A. WARD.

[FIRST PRINTED 1911.]


A. W. Hale,
Meat Mincer.
No 2,136.
Reissued Dec. 26, 1865.
Fig. 3.
Fig. 1.
Fig. 5.
Fig. 4.
Fig. 2.
Fig. 6.
Witnesses:
Alex M. Ward
L. A. Ward
Inventor:
Albert W. Hale
N. PETERS, PHOTO-LITHOGRAPHER, WASHINGTON, D. C.

United States Patent Office.

ALBERT W. HALE, OF NEW YORK, N. Y.

MEAT-MINCER.

Specification forming part of Letters Patent No. 23,246, dated March 15, 1859; Reissue No. **2,136**, dated December 26, 1865.

To all whom it may concern:

Be it known that I, ALBERT W. HALE, of the city and State of New York, formerly of New Britain, in the State of Connecticut, have invented a new and Improved Machine for Cutting or Mincing Meat, Vegetables, &c.; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, and making a part of this specification.

The nature of my invention consists generally in the arrangement and use of one or more grooved cylinders or rollers revolving in a grooved or ribbed case and acting against a stationary knife, whereby I produce a machine economical and simple in construction, not liable to get out of order, and which can be easily kept sweet and clean for use.

Figure 1 is a perspective view, the upper case being removed or open, showing the construction of the case, the position of the grooved cylinders or rollers, and also the place of discharge of the minced article. Fig. 2 is a view of the lower case, one cylinder being removed, showing the position of the knife, and also the construction of the lower case or cylinder-bed. Fig. 3 is a view of that portion of the lower case holding the knife. Fig. 4 is an end view of the cylinders and knife in position, one cylinder being changed end for end, so as to show both the greatest and shallowest depth of the grooves. Fig. 5 is a side view of the machine with a stuffer attached. Fig. 6 is a sectional view of the machine with a single cylinder instead of two.

The upper and lower cases, A and B, are constructed or fitted with ribs or projections *a a*, Figs. 1, 2, upon their inner concave surfaces, which form, when the cases are in position or closed, a continuous spiral rib or screw, inclining forward and toward the orifices *b b*, at which the minced article is discharged. These ribs *a a* may have any angle or inclination, more or less, as preferred and as desired to have the meat, &c., pass slower or faster through the machine; but I generally prefer to give them such an inclination that in passing once around they shall have advanced a distance about equal to the diameter of the feeding-orifice C, in order that anything fed into the machine would naturally in a single revolution pass beyond the orifice C.

The cylinders or rollers D and E are of such a size as very nearly to fill the space between the cases A and B when closed, and so as to prevent the passing of anything of much size or bulk between the case and the rollers. These cylinders have also a number of spiral grooves, *c c*, running lengthwise, the spiral curve of which may be greater or less as desired or found most convenient. The drawings represent five such grooves upon each cylinder, but the number is merely arbitrary and may be varied as desired. These grooves are also not of uniform size, but vary in depth, as seen in Figs. 1, 4, their depth at one, or, as it may be called, the "front," end, being about equal to the distance from the shaft or axle F to the periphery of the cylinder, and thence gradually diminishing toward the other end, until the bottom of the groove nearly reaches the periphery of the cylinder, as seen in Fig. 4, its distance here being more or less as it may be desired to have the thing cut coarser or finer, as from these ends of the grooves everything is discharged from the machine, and nothing can pass out until cut small enough to pass through these diminished orifices.

From this construction of the cylinders and their grooves it is readily apparent that pieces of meat, &c., while of any largish size, are prevented from passing into the shallowest parts of the grooves and are continually pressed backward and carried by the revolution of the cylinders toward the knife or knives, hereinafter mentioned, and will only be discharged from the machine when cut fine enough to pass out of the apertures *b b*, made by the shallowest ends of the grooves with the surrounding case.

The diminishing of the area of the grooves or spaces between the flanges of the cylinders D and E may also be effected by decreasing the diameters of such cylinders at one end, thus giving them the form of a frustum of a cone, and in such cases making the outer cases to fit to such form, and also in other ways. The particular form and arrangement of the parts are not material so long as this feature of diminishing the sectional area of the grooves or spaces between the flanges is substantially preserved.

The number of grooves and flanges may also be greater at one end of the cylinder than at the other, and the flanges may have a variable twist. The flanges or highest parts of such grooves make at the periphery of such cylinders edges *e e*, which act against the knives referred to with a drawing or shearing cut.

The position of the cylinders D and E in the cases A and B is such that the flanges or edges *e e* will lap a little upon each other, as shown in Figs. 1 and 4, so that the cylinder operated by the crank F will communicate motion to the other without gearing, and thus cause both cylinders to revolve toward the knife placed between them, as hereinafter described, carrying with them by means of the grooves *c c* the article to be cut, and which the depth of the grooves, as before set forth, prevents from passing forward and out of the orifices *b b* until it is sufficiently cut and minced.

Instead, however, of constructing the cylinders with grooves, as described, a shaft or axle may have flanges radiating from it or placed tangentially upon it, which shall act upon the knife H in the same way as the edges *e e*, the spaces between such flanges being so filled, or the depth of the flanges being so diminished, as substantially to secure the taper of the groove above referred to. Nor is the spiral direction of the grooves or edges, as above described, absolutely essential, as their arrangement may be varied by making the flanges of the revolving cylinder parallel to its axis and inclining the edge of the knife, and so adjusting the cylinders as to preserve and secure the benefits and advantages of the shearing-cut of such edges on the knife, as described.

The position of the knife or knives H is shown in Fig. 2, and also an end view in Fig. 4. They extend the length of the cylinders, and rest in a slot or recess in the lower or under case, B, directly between the cylinders, (shown in Fig. 3,) and are of such a height that the edge *h* will be at that point or line where the grooved cylinders leave each other. As these cylinders revolve, therefore, their flanges *e e* will be constantly acting upon the edge of the knife with a drawing or shear cut, thus acting most easily and effectually.

The slot or recess in which the knife or knives rest may be a little tapering on one side, so as to allow the insertion of a small wedge, *f*, Fig. 3, to fasten the knife, or such slot may be of uniform width and broader, with tapering wedges placed on each side of the knife, operated by screws at either end, so that the position of the knife may be adjusted as desired, or such slot may have a width uniform and a little greater than the thickness of the knife, so that the knife may rest in it loosely, its edge being kept in position by contact with the cylinders.

In order to give the edge of the knife the proper position in respect to the cylinders D and E, the ends of the back of the blade are beveled or chamfered, as shown by the dotted lines *f f'*, Fig. 2, against which work screws *g g*, to elevate the knife, as necessary, or the blade may rest upon a small steel or other spring underneath it, or on a strip of rubber or other elastic material, or upon a wedge operated from either end to insure the contact of the edge.

The same principle of operation may be secured by the use of a single revolving cylinder, though, of course, the capacity of the machine will be somewhat less. Such an arrangement is shown in Fig. 6. In such case the ribbed cases and grooved and flanged cylinders will be the same as above described, but the knife H will stand at one side of the cylinder D' and will be supported at its ends, and perhaps at its middle, and the article cut will pass outside of the knife into a cavity or recess, G, cast at one side of the cases for such purpose, and from thence under the knife, and again in contact with the cylinder D', and by it be again carried to the knife. A more rapid operation may be obtained by placing a knife on each side of such cylinder.

By attaching a funnel or stuffer, J, as shown in Fig. 5, to the machine, casings of any kind can be filled at the same time the meat is minced. Without the stuffer the machine is fitted for the ordinary uses of cutting and mincing.

The several parts of the machine may be cast and are at once fit for use, except that the knife may be better rolled out the desired shape and tempered or hardened, and the cylinders may be cast, rolled, or forged. The whole is simple in construction, not liable to get out of order, and every part is easily cleaned and kept sweet for use.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The use and application of a flanged cylinder or cylinders, having the grooves between such flanges tapering or diminishing in depth, substantially as set forth.

2. The use and application of a cylinder or cylinders having spiral flanges with grooves between them diminishing or tapering in depth, substantially as set forth.

3. The combination of two cylinders with spiral flanges so arranged that the flanges of one cylinder overlap those of the other, so that the cylinder operated by the power or crank will give motion to and rotate the other without the interposition of other gearing.

4. The combination of a cylinder or cylinders having spiral flanges or tapering grooves with a shearing-knife, and a case having spiral ribs on its inner surface, substantially as set forth.

5. The combination of two cylinders or conic frustra having straight or spiral flanges or tapering grooves with a knife or case with or without spiral ribs.

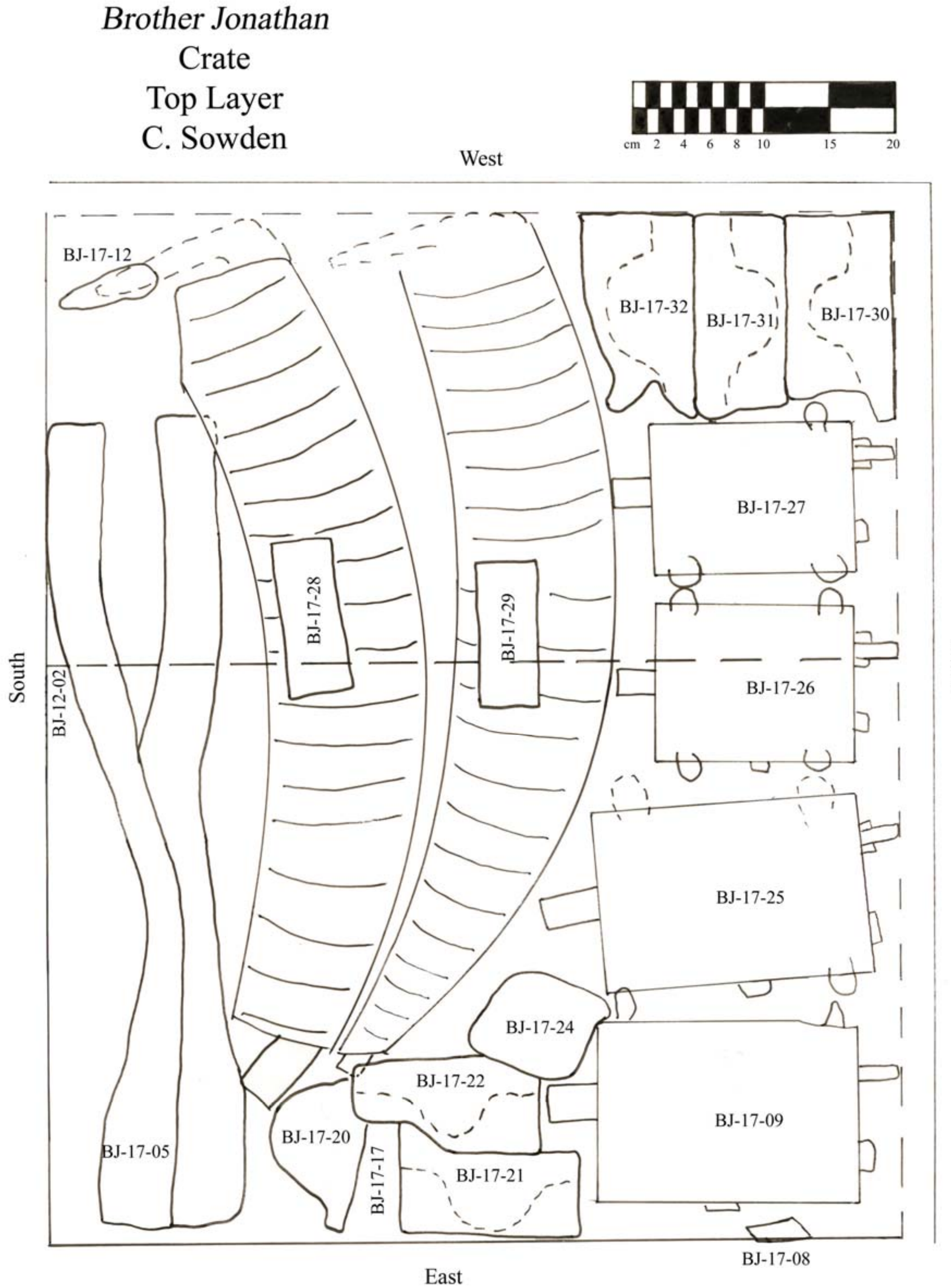
6. The combination of two cylinders having spiral flanges and tapering grooves with a shearing-knife and a case having spiral flanges.

ALBERT W. HALE.

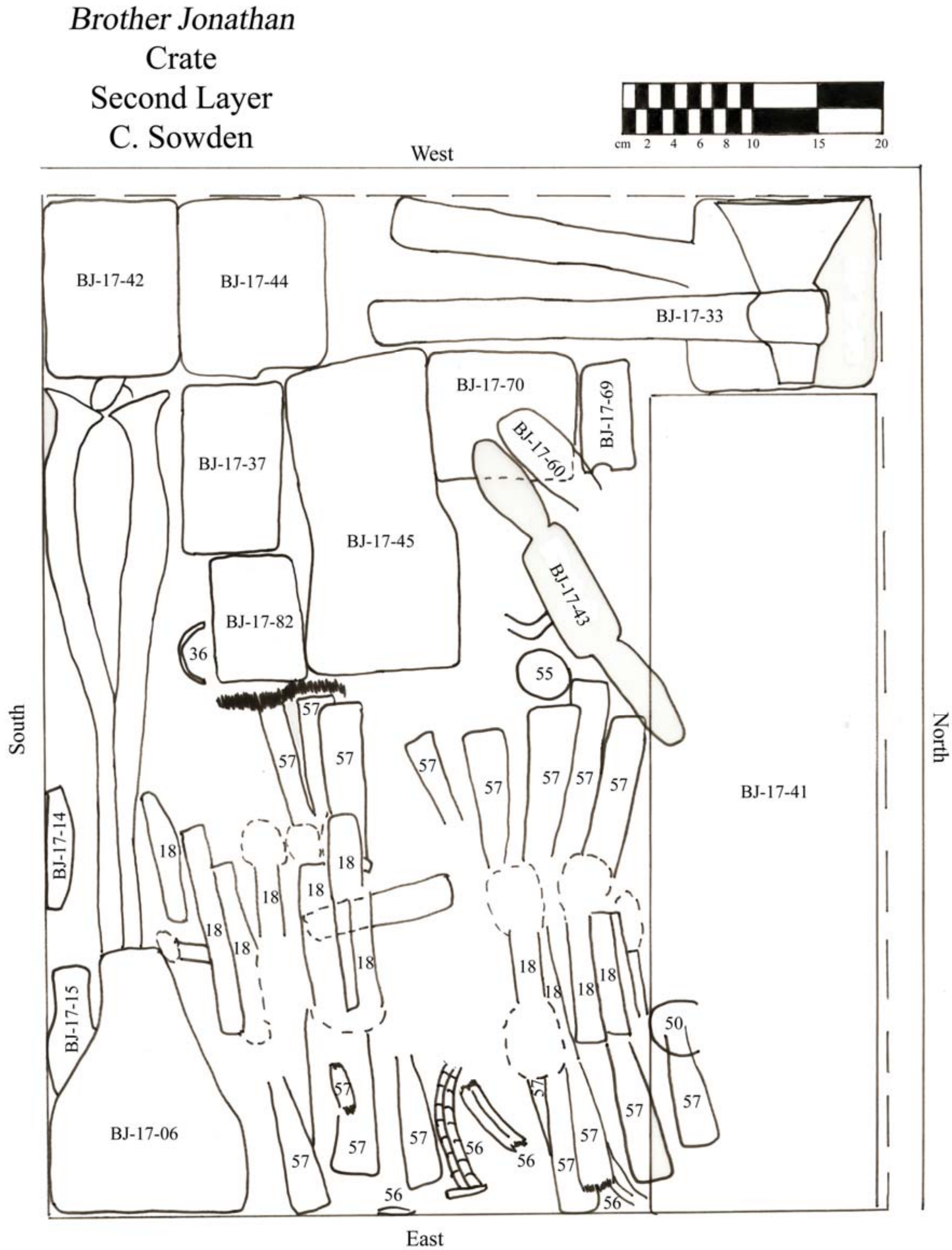
Witnesses:
S. D. LAW,
W. R. RONALDS.

APPENDIX E

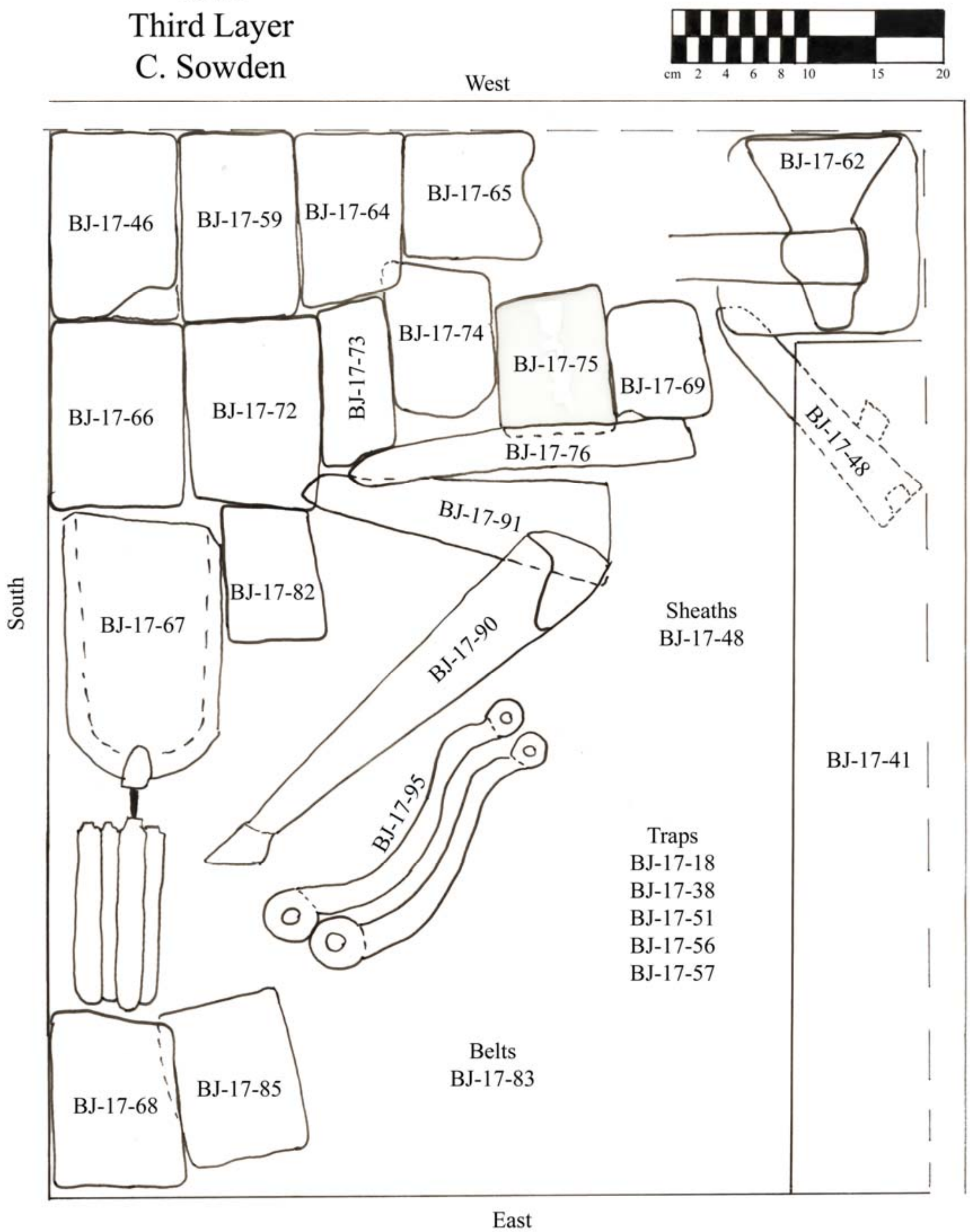
BROTHER JONATHAN CRATE SITE PLANS



Brother Jonathan
Crate
Top Layer
C. Sowden
cm 2 4 6 8 10 15 20
West
South
North
East
BJ-17-12
BJ-17-32
BJ-17-31
BJ-17-30
BJ-17-27
BJ-17-28
BJ-17-29
BJ-12-02
BJ-17-26
BJ-17-25
BJ-17-24
BJ-17-22
BJ-17-09
BJ-17-20
BJ-17-05
BJ-17-17
BJ-17-21
BJ-17-08


Brother Jonathan
Crate
Second Layer
C. Sowden
cm 2 4 6 8 10 15 20
West
East
South
North
BJ-17-42
BJ-17-44
BJ-17-33
BJ-17-70
BJ-17-69
BJ-17-60
BJ-17-37
BJ-17-45
BJ-17-43
BJ-17-82
36
55
BJ-17-41
BJ-17-14
BJ-17-15
BJ-17-06
57
18
50
56

Brother Jonathan
Crate
Third Layer
C. Sowden



APPENDIX F

PHOTO TIME LINE OF THE *BROTHER JONATHAN* CRATE DISASSEMBLY

The following is a selection of photographs taken of the *Brother Jonathan* crate; each photo was taken from above as the excavation progressed. It shows how the crate was packed and then unpacked 130 years later.

Disassembly Stage 1. *Photography by A. Borgens.*

West

South

North

East

Disassembly Stage 2. *Photography by C. Sowden.*

West

South

North

East

Disassembly Stage 3. *Photography by A. Borgens.*

Disassembly Stage 4. *Photography by A. Borgens.*

Disassembly Stage 5. *Photography by C. Sowden*

Disassembly Stage 6. *Photography by A. Borgens.*

Disassembly Stage 7. *Photography by C. Sowden.*

West

South

North

East

Disassembly Stage 8. *Photography by C. Sowden.*

West

South

North

East

Disassembly Stage 9. *Photography by J. Swanson.*

West

South

North

East

Disassembly Stage 10. *Photography by J. Swanson.*

APPENDIX G

LETTERS OF PERMISSION

APT

March 10, 2006

To whom it may concern:

Carrie Sowden has permission to use images from the following publication for her thesis at Texas A&M.

Russell and Erwin Manufacturing Company
1865 *Illustrated Catalogue of American Hardware of the Russell and Erwin Manufacturing Company.* Russell and Erwin Manufacturing Company, New Britain, CT. Reprinted 1980 by Association for Preservation Technology, Lisle, IL.

Sincerely,
Nathela Chatara

Nathela Chatara
Administrative Director

THE GREAT LAKES HISTORICAL SOCIETY

FOUNDED 1944

P.O. Box 435
Vermilion, Ohio 44089-0435
Telephone: (440) 967-3467
(800) 893-1485

CHRISTOPHER H. GILLCRIST
Executive Director

Inland Seas Maritime Museum
The Clarence S. Metcalf Library
Vermilion, Ohio

Peachman Shipwreck Research Center

INLAND SEAS® **&** *THE CHADBURN*
Publications

Facsimile: (440) 967-1519
E-mail: glhs1@inlandseas.org
Website: www.inlandseas.org

March 22, 2006

To Whom It May Concern,

Carrie Sowden has permission to use drawings of the *SeeandBee* from the collection of the Great Lakes Historical Society in her Master's Thesis for Texas A&M University.

Christopher H. Gillcrist

VITA

Carrie Elizabeth Sowden

Date of Birth: July 19, 1975

Address: Great Lakes Historical Society
480 Main Street
PO Box 435
Vermilion, OH 44089

Education:

2006	M.A. in Anthropology, Nautical Archaeology Program. Texas A&M University, College Station, TX.
1997	B.S. in Chemistry. Emory University, Atlanta, GA.

Archaeological Field Experience:

2005-2006	*Dundee* shipwreck survey, Great Lakes Historical Society, Cleveland OH. Director.
2005	*The Craftsman* shipwreck survey, Great Lakes Historical Society, Lorain, OH. Archaeologist.
2003-2006	*Heroine*/Red River shipwreck project, Oklahoma Historical Society, Institute of Nautical Archaeology, Swink, OK. Archaeologist, Divemaster, Conservator.
2002	Uluburn Shipwreck Research Project, Museum of Underwater Archaeology, Bodrum, Turkey. Institute of Nautical Archaeology.
2002	The Galley *Kadirga* Project, Istanbul Naval Museum, Istanbul, Turkey. Institute of Nautical Archaeology.
2001	Angra C and D Shipwreck Project, Institute of Nautical Archaeology and Direcção Regional da Cultura. Angra de Herosimo, Terceria, Azores, Portugal.
2001	Cais do Sodré Shipwreck Project. Centro Nacional de Arqueologia Náutica e Subaquática. Lisbon, Portugal
2000	Little Creek Channel Expansion. R.C. Goodwin and Associates. Norfolk, VA.
2000	Gulf of Mexico Pipeline Project. R.C. Goodwin and Associates. Dauphine Island, AL and St. Petersburg, FL.
1997	*Angel Gabriel* Project. University of Maine, Darling Marine Center. Pemaquid, ME.
1996-1997	Boon Island - *Nottingham Galley* Project. Maine State Museum and Darling Marine Center. Walpole, ME. Conservator.